

**JANUARY • 1946**

**Vol. 3 • No. 1**

Page

<b>SUPER OPAQUE TITANIUM ENAMELS</b>	
.....By C. M. Andrews & A. I. Andrews	17
<b>HAVE YOU INVESTIGATED THIS MARKET FOR PORCELAIN ENAMELED PRODUCTS?</b>	
.....By A. McB. Colledge	22
<b>SPRAYING — vs — DIPPING</b>	
.....By Paul E. Gerdes	25
<b>CASE HISTORIES OF ARCHITECTURAL INSTALLATIONS USING PORCELAIN ENAMELED STEEL</b>	
.....By Elsa Gidlow	27
<b>PROGRESSIVE PURCHASING POLICIES</b>	
.....By F. H. Guthrie	31
<b>PORCELAIN ENAMEL INSTITUTE FORUM</b>	36

*Features*

<b>THE FINISH LINE — An Editorial</b>	15
<b>RESEARCH (Guest Editorials)</b>	Pages 34 & 35
<b>PORCELAIN ENAMEL INSTITUTE FORUM — finishfotos</b>	38 & 39
<b>EXAMPLES OF PRODUCTION AND PLANT EXPANSION</b>	42 & 43
<b>I.C.H.A.M. CONVENTION — finishfotos</b>	46
<b>CHICAGO ENAMELERS CLUB — finishfotos</b>	48
<b>GULF'S "BRIGHT SPOT" IS STILL BRIGHT</b>	66 & 67

*Ceramic Finish News*

<b>THIRTEENTH ANNUAL MEETING OF APPLIANCE MANUFACTURERS</b>	47
<b>CHICAGO ENAMELERS DECEMBER MEETING</b>	49
<b>EASTERN ENAMELERS SECOND POSTWAR MEETING</b>	50
<b>INDUSTRY NEWS AND PERSONALS</b>	51
<b>THE WASHINGTON ROUND-UP</b>	63

*Miscellaneous*

<b>NEW SUPPLIES &amp; EQUIPMENT</b>	68
<b>INDUSTRIAL LITERATURE</b>	69
<b>ADVERTISERS' INDEX</b>	76
<b>CLASSIFIED ADVERTISING</b>	76



**LONDON GUARANTEE BUILDING**  
Michigan Avenue at Wacker Drive

THE HOME OF

*finish*

MONTHLY TRADE PUBLICATION

Published by

DANA CHASE PUBLICATIONS

360 North Michigan Avenue

Chicago 1

Telephone Central 1229

The only independently published trade publication devoted exclusively to Porcelain Enameling and Ceramic Finishing on metal.

Free controlled circulation to management, purchasing and key plant personnel in companies intimately connected with the domestic ceramic finishing industry. To others, subscription price \$3.00 per year. Foreign subscription price (U. S. funds) \$5.00 per year.

Editor and publisher, DANA CHASE. Associate editors, PROF. A. I. ANDREWS and PROF. R. M. KING.

COPYRIGHT 1945

DANA CHASE PUBLICATIONS

PRINTED IN U.S.A.

# finish

**CERAMIC FINISHES ON METAL**

TP 785  
F 49  
v. 3

# C O N T R O L

Split second timing and control is required of the experts on skis who attain speeds of more than sixty miles per hour and jump several hundreds of feet. . . The "Lo-Hi" pH Process of chemically cleaning steel, preparatory to porcelain enameling, makes practical a control in the pickle room that gives management the know-what-to-plan-on the rest of the way in production. A comparatively small appropriation for this department (the bottle neck of most plants) will pay handsome dividends all the way down the line. . . The findings of our laboratories and our experience in solving this problem for many manufacturers, is at your disposal.

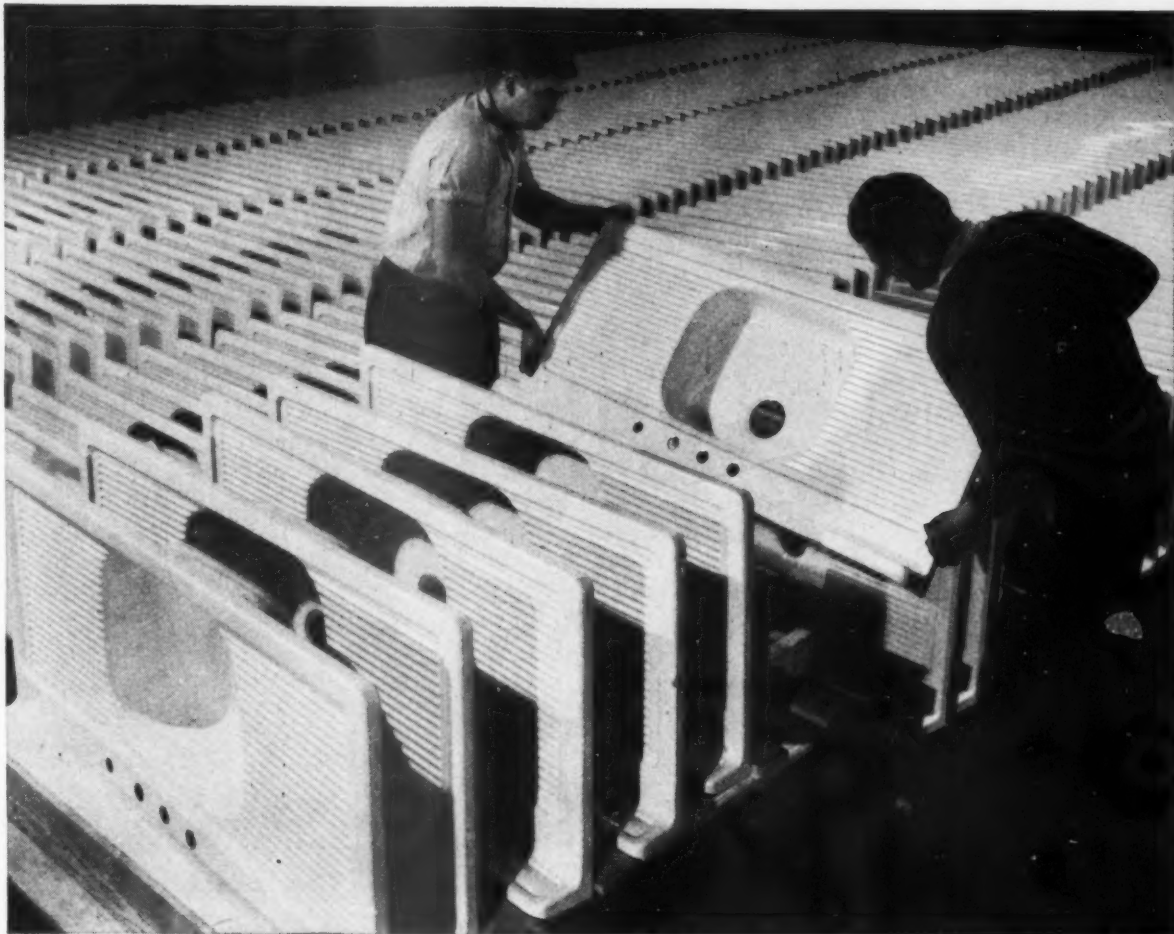


**NORTHWEST CHEMICAL CO.**  
9310 ROSELAWN DETROIT 4, MICH.



pioneers in pH cleaning control—serving you since

'32



## What do manufacturers make?

"WHY, anything and everything," you'll probably say.

Right, but that's not all . . .

Every manufacturer who makes a good product also helps make something else . . . *a strong and prosperous United States.*

He does this in a very simple and fundamental way . . . *by keeping men and dollars at work.*

This is the time-tested American formula for gaining and maintaining a high standard of living. By applying it through free enterprise, we have been able to create more of everything for ourselves than any other nation in the world.

Yet, obvious as it is, this idea has frequently been lost sight of . . . sometimes by ourselves in difficult times, more often by other nations who sought to create prosperity by state edict and government control.

Here at Mullins we manufacture large steel stampings and porcelain enameled products. It is our aim

to make a good product, and sell it at a price that will keep men and dollars profitably employed.

This is our small part in maintaining national prosperity, and we feel our responsibility deeply. Every other manufacturer, whether he thinks of it or not, makes his contribution in a similar way.

If you believe this is a sound view of industry, you may be interested in a booklet we have distributed to our employees, "Not by Bread Alone." It discusses, in a simple way, some of our ideas about the true relationship between industry and general prosperity. Your request will bring a copy, and if you think it would interest your own employees, let us know.

**MULLINS MANUFACTURING CORPORATION, Salem, Ohio**



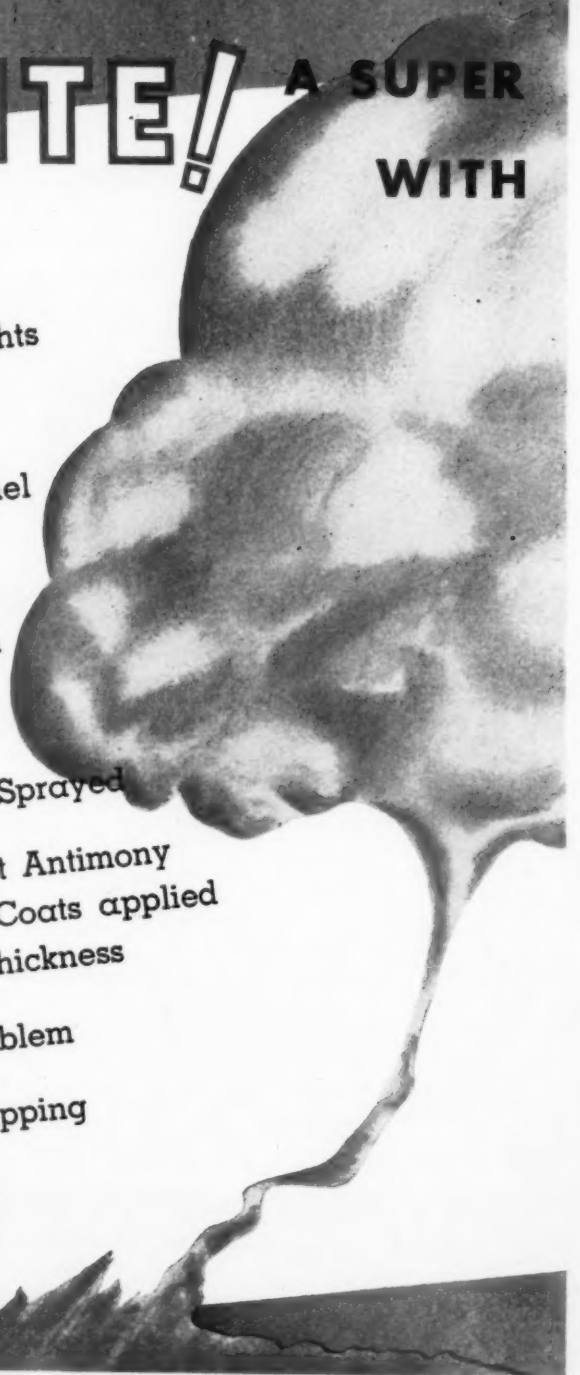
**DESIGN ENGINEERING SERVICE • LARGE PRESSED METAL PARTS • PORCELAIN ENAMEL PRODUCTS**

AN ~~ATOMIC BOMB~~

# TITE-WITE! A SUPER WITH



- 15—20 Gram Application Weights
- 75—80% Reflectance
- A Super White Opaque Enamel
- Regular and Acid Resisting
- Exceptional Bonding Strength
- Lower Production Costs
- Can be Drained, Dipped or Sprayed
- A Finish Equal to the Finest Antimony free Super Opaque Cover Coats applied at twice to three times the thickness
- Reduces Black Edging Problem
- Practically Eliminates Chipping
- Better Scratch Resistance



# FOR THE *Enameling* INDUSTRY

## WHITE OPAQUE PORCELAIN ENAMEL APPLICATION WEIGHTS OF 15-20 GRAMS

Ask to see Tite-Wite, regardless of the finish you are now using. Tite-Wite is a porcelain enamel that will open the door to many new fields. Tite-Wite is THE Finish to use.

Research was started on this revolutionary new porcelain enamel in the early 1930's and was nearly completed when the war interrupted. After V-J Day "Tite-Wite" was soon a reality.

Tite-Wite enamel at 15 gram application compared with  
the best White Opaque Frit

TITE-WITE BEST WHITE FRIT A	Application Weight	Reflectance
	15 grams	75%
	20 grams	78%
	37 grams	75%
	50 grams	78%

Laboratory Controlled Production of Ceramic Supplies

### O. HOMMEL CO.

PITTSBURGH 30, PENNA.

Pacific Coast Agents  
L. H. BUTCHER CO.

- FRIT for Steel, Cast Iron or Pottery
- CERAMIC COLORS
- CHEMICALS
- BRONZE POWDERS
- METAL POWDERS
- SUPPLIES
- EQUIPMENT

"Tite-Wite" is ready for immediate delivery.  
Our service and sales organization will be glad to discuss with you . . . how Tite-Wite can be adapted to your product . . . No obligation, of course.

Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems

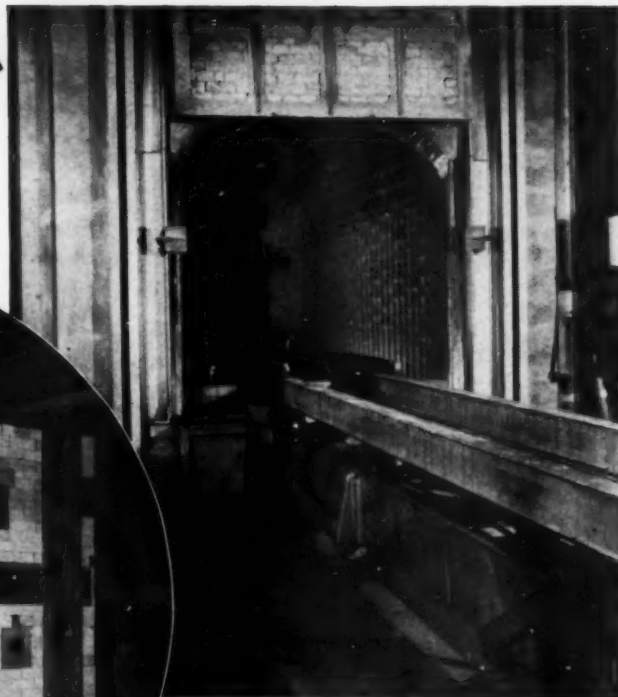


*World's Most Complete Ceramic Supplier*

**IF IT'S NEW CONSTRUCTION...**

**OR MAINTENANCE**

**CALL  
HUYCK**



↑ This enameling furnace, now in its 9th year of service, is a representative example of Huyck supervision and expert masonry.

← A typical frit smelter installation by Huyck Construction Company showing smelter under construction.

- ★ ★ ★ Why do we solicit both new construction work and maintenance? Because in the first place our organization of skilled masons is keyed to the building of structurally sound, long lasting jobs. Second, by taking the responsibility of maintenance, long life and economical operation are assured at minimum upkeep cost.
- ★ ★ ★ Repeat business — that's our aim, and the fact that we serve the same companies year after year is the best proof of satisfied customers.
- ★ ★ ★ If you have new construction, rebuilding of furnaces or smelters — maintenance work only — mill lining work — in fact, any work requiring skilled masons — consult with us before placing your next job. Huyck's prices are right. Write, wire or phone —

## **HUYCK CONSTRUCTION COMPANY**

2946 North 78th Ct.

• Phone: Elmwood Park 1339-M

ELMWOOD PARK, ILLINOIS



**Put HARSHAW**  
*into your*  
**NEW PRODUCTION**  
**PLANS**

**J**UST as your experiences in prewar and wartime manufacturing now help you in your new production planning, so likewise does Harshaw apply similar experiences in developing and manufacturing chemicals to help you. ★ Through decade after decade, persevering research and field investigation have enabled Harshaw to supply thousands of manufacturers with hundreds of chemicals which perform satisfactorily in their manufacturing processes. ★ Include Harshaw chemicals in your production plans for today and tomorrow. ★ You can order them with confidence.

finish JANUARY • 1946



**COLORS • OPACIFIERS**  
**FRITS • CHEMICALS**

**THE HARSHAW CHEMICAL CO.**  
1945 East 97th Street, Cleveland 6, Ohio  
BRANCHES IN PRINCIPAL CITIES

# COMPLETE *Finishing* SYSTEMS



The famous Nineteen Hundred Line receiving its first finish coat in Mahon Hydro-Filter Spray Booths.



Nineteen Hundred line moving through Mahon Hydro-Filter Spray Booths on the continuous conveyor production line.



Final Finish Coat is applied as products pass through Mahon Hydro-Filter Spray Booths installed in an enclosed Spray Room which is supplied with heated filtered air.

## ... COMPLETE EQUIPMENT ... from Preparation of Metal to Final Finish Coat

At the Plant of the Nineteen Hundred Corporation, Mahon equipment is relied upon exclusively to produce the fine finish of the Nineteen Hundred Line. In plants of this type, where mass production and efficient methods must be aimed at eye-appeal and saleability of finished products, executives turn to Mahon . . . Why? . . . because over twenty-five years of experience has endowed the Mahon organization with a wealth of technical knowledge in this field not available elsewhere . . . because Mahon engineers, builds, and installs the Complete Finishing System—complete responsibility lies with one organization. What Mahon engineers have done for the Nineteen Hundred Corporation, and hundreds of other manufacturers, can also be done for you. Consultation places you under no obligation.

Address Correspondence to INDUSTRIAL EQUIPMENT DIVISION

**THE R. C. MAHON COMPANY**

Home Office and Plant, Detroit 11, Michigan  
Western Sales Division, Chicago 4, Illinois

Manufacturers of Complete Finishing Systems including: Metal Cleaning Machines • Rust Proofing Machines • Dry-off Ovens • Hydro-Filter Spray Booths • Drying and Baking Ovens • Filtered Air Supply Units • Hydro-Foam Dust Collectors • Paint Sludge Reclaiming Units, and Many Other Units of Special Production Equipment

# MAHON

1911-1918-1925-1932-1939-1946

## EVERY 7 YEARS NEW MONARCH HAS MORE THAN DOUBLED ITS PRODUCTION FACILITIES

Although, from its organization, New Monarch has enjoyed a steady and remarkably rapid increase in its precision stamping business, the year now ending has seen the completion of an unusually extensive expansion program.

This program has included, among other things, a modern, new factory building, known as Plant No. 3 in our group of up-to-the-minute production plants; extensive new die shop equipment; many new punch presses, among them the giant, 500-ton hydraulic forming press; automatic continuous-seam welders and many special, heavy duty spot welders. The latest finishing equipment, drying ovens, special assembly lines and packing facilities have also been added.

This, then, is our 1946 report to the industry we have so long served and which we are now prepared to serve as never before. Whether your needs be for better engineered dies, tools or stampings—or the assembly, finishing and packing of a complete product, our service, always of the best, is now truly in a class by itself.

Why not consult New Monarch engineers regarding the use of steel stampings? They may make possible an important improvement for your product. Write today for full information.



*When you think of Stampings, think of*  
**NEW MONARCH MACHINE & STAMPING CO.**  
406 S. W. NINTH STREET  
DES MOINES 9, IOWA

1. Washing Machine Leg. 2. Two-Piece Welded Steel Silo Leg. 3. Instrument Panel for Greasing Equipment. 4. Completely Stamped and Assembled Hiway Flare. 5. One-piece Range Top. 6. Hot Water Heater Door Assembly.

# DEVILBISS *Automatic*



*for Fast Action*

This Devilbiss Automatic Transverse Spray Machine with a downdraft exhaust system sprays porcelain enamel on wall tile at a high rate of speed.

# MACHINE SPRAYING

Look ahead and you'll see more and more plants in the porcelain enameling and ceramic industry using this modern, efficient and economical method of finishing. Because DeVilbiss Automatic Transverse Spray Machines offer the timely advantages of raising the speed of quality finishing to an all-time high and reducing finishing costs to a record low.

Automatic DeVilbiss Guns do the work. They are mounted on a transverse carriage which moves back and forth over a continuous line of work, loaded closely together on a conveyor. They can finish 15 to 25 feet a minute. The output of these machines in finishing wall tile, stove panels and other products has been amazing.

## *and Lower Costs*

You save in two ways from the DeVilbiss Automatic Transverse Spray Method. Through its modern, high speed operation, unit finishing costs are substantially less. By reducing manual operations to loading and unloading the conveyor line, great savings in man-hours are effected. Production records prove this.

Whether your product is tile or porcelain panels, you will be well rewarded by looking into the advantages of DeVilbiss Automatic Spray Methods. Ask a DeVilbiss Engineer to show you what they are doing for others and what they can do for you.

**THE DEVILBISS COMPANY • TOLEDO 1, OHIO**

Canadian Plant: WINDSOR, ONTARIO

# DE VILBISS



*means Quality in all four...*

**SPRAY EQUIPMENT  
EXHAUST SYSTEMS  
AIR COMPRESSORS  
HOSE & CONNECTIONS**

**"Get acquainted  
with Century Frits  
for 1946"**



It will pay you to get acquainted with these Century frits during 1946. The more familiar you become with these frit bags, and the smooth plant operation that is assured when their contents are used, the more profitable will be your enameling operations for the year.

The fourteen years' of valuable experience in both the manufacture and application of porcelain enamels back of Century means that the frits that you buy today are time-proved. They are proved for workability and smooth shop operation, and they are proved for low final cost per square foot of finished ware.

Start the year right by specifying "Century" frits from the steel out — ground coats that have dependable bond; cover coats that have the luster and smoothness you need; clear frits that give depth and beauty to any colored product; and acid resisting enamels that are really acid resisting. 1946 will be a "Century" year in many of the country's leading enameling plants.



**CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.**

# THE *Finish Line*

See Mr. Manson's reply to  
the finish line for Decem-  
ber, 1945, on page 64.

**FINISH HAS A SECOND BIRTHDAY** — let's glance at a picture of its first two years of service by quoting brief excerpts from "The Finish Line" for 1944 and 1945.

## **Publication Policy — January, 1944**

Provide the Ceramic Finishing Field with its first independently published trade paper devoted exclusively to the Industry . . . .

Publish in attractive, modern, readable form a convoy for the best thoughts in the industry for the advancement of the entire ceramic finishing field.

Edit with open minds, unhampered by prejudices or subsidy, a publication endowed with complete freedom of action, both editorially and financially.

Your editor has full realization that the success of this new venture is as dependent on the active cooperation of the organizations in the industry as upon the publisher and *finish* writers . . . . This is your publication in which we will serve you to the best of our ability.

*We believe our original policy to be sound after two years' trial and it remains unchanged. As for industry cooperation, it has been wholehearted and complete from every quarter.*

## **Thanks Again — April, 1944**

We again want to express our appreciation to the contract advertisers and their agencies who have been exceedingly patient through a period when it was impossible for *finish* to supply definite information with regard to future schedules. (Remember our paper struggle with W.P.B.)

With the uncertainty eliminated you will see *finish* grow, and we hope to assist in the future growth of the industry as well.

*Finish is growing, as is the industry. The original advertisers are with us and you will see many new ones in the months to come. It is their confidence in Finish that insures its steady growth.*

## **What are the Facts? — December, 1944**

Never in the history of high production porcelain enameling has there been the expansion in enamel plant facilities that is taking place, and will take place to a greater degree when materials and equipment are more

*finish* JANUARY • 1946

readily available. Literally dozens of continuous furnaces are on order, and will be installed along with all kinds of the latest in modern enameling equipment. The people who will be installing them have kept up to date on enameling developments — they *know* that there will not only be *more* enameling but also *better* enameling done after the war than at any time in the history of the industry.

## **What about it? — June, 1945**

Porcelain enamel needs, and always has needed, far stronger backing in educational and promotional activity. Without belittling the efforts of cooperative organizations, individual steel and frit producers, and the few manufacturers of finished products who *are* doing an excellent job, we say that before porcelain enamel has a chance to compete in promotion with any of the materials (competitive materials) mentioned, scores of others must add the weight of their time and money to this effort.

## **For new or old — July, 1945**

. . . If we, as an industry, ever come to the realization that in working *as a team* to sell porcelain enameled metal *as a product* we will feather our own beds as jobbers or manufacturers of table tops, appliance parts, kitchen ware, etc., we will have taken the first important step in producing a winning team.

## **If the shoe fits — November, 1945**

. . . Fortunately, or "unfortunately," as competitive materials have taken a large slice from enameling "yardage" other new products have come along to keep production high, i.e., loss of refrigerator exteriors replaced by a higher production of washing machine tubs, architectural porcelain, etc.

We have never really had to "fight" for continued good business. If this were not true we would probably still be furnishing porcelain enamel for 50% of the refrigerator exteriors. *Figure that volume on any production chart!*

Yes, happy days are here again — we hope — but we should be willing to fight for them with sound selling and an adequate promotion program.

*Dana Chase*  
EDITOR AND PUBLISHER

# VITREOUS ENAMELING Made Easier by INLAND RESEARCH

---

The most recent product to come from the Inland research laboratories is TI-NAMEL—the new vitreous enameling alloy steel to which the cover coat, in white or any shade, can be applied directly to the base metal.

When you try Inland TI-NAMEL in your own shop you will learn at first hand how it will cut fabrication and enameling costs, and result in products of superior finish and longer service life.

You will find that Inland TI-NAMEL has drawing qualities equal to the best deep drawing steels. It eliminates ground coat operations; reduces re-operations, edging, and scrap. These short-cuts save floor space and greatly increase shop output.

Inland TI-NAMEL is the modern base for vitreous enameled products of greater eye appeal and for broader markets. Write for the new TI-NAMEL Bulletin.

Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company and Titanium Alloy Manufacturing Company under trust agreement.

Principal Products: Bars • Structural • Plates • Sheets • Strip • Tin Plate • Floor Plate • Piling • Reinforcing Bars • Rails • Track Accessories

**INLAND STEEL COMPANY**

**38 South Dearborn Street, Chicago 3, Illinois**

Sales Offices: Cincinnati • Detroit • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul

## INLAND TI-NAMEL

# Super opaque titanium enamels

experimental procedure, development data and frit compositions

By *C. M. Andrews* AND  
*A. J. Andrews* • UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS

### I • INTRODUCTION

To the enameler, who is constantly seeking means of improving the reflectance of cover coat enamels, titanium oxide (anatase) with its high index of refraction has long been of interest as an opacifier and investigators have reported on various types of enamels in which titanium oxide was a major constituent. Although many of these enamels had high opacity, their tendency toward a cream or yellow color was considered objectionable. No great success has been reported in the use of titanium oxide as a mill-added opacifying compound, probably because of its solubility in many frit compositions.

Dr. B. Niklewski in a recent communication recommended a titanium oxide bearing enamel, which he has had in production in Europe for some time. This enamel was found to have high reflectance, good texture and gloss, and fair color. The purpose of this investigation was (1) to study this type of enamel by observing the effect of modifying its composition and (2) to determine whether or not it was suitable to and could be adapted to American conditions.

The observations made in the study of the various compositions described in this paper were based entirely on results obtained in the laboratory. These results indicate that this type of enamel has interesting possibilities for industrial application.

### II • EXPERIMENTAL PROCEDURE

Preliminary work on the composition recommended by Dr. Niklewski consisted of a general study of its characteristics and properties. Fifteen hundred gram batches were screened, mixed, and smelted in gas fired pot furnaces. A detailed ac-



count of observations made during smelting is given in part III.

To determine the best mill additions to use with this type of frit, numerous 500 gram batches were ground in small ball mills with various percentages of clay and electrolytes. No opacifying compound was used in these trials. Slight variations in clay content were found to have a decided effect on gloss. The best results were obtained with the mill additions shown in Table I.

Table I  
Mill Additions

Frit .....	100
Clay .....	5
Sodium aluminate .....	1/4
Bentonite .....	1/4
Water .....	40
Fineness .....	6-8% (P.E.I. test)

Various thicknesses of the enamel were applied to ground coated plates and trials were made to determine the best firing practice.

In studying the effect of modifying the original composition a definite laboratory procedure was followed so that the enamels could be more easily compared. The smelting practice was standardized insofar as the various compositions would permit. All frits were ground with the mill additions shown in Table I, and the enamel was applied to ground coated plates at forty five grams per square foot. Reflectance measurements were made

on a Hunter Multi-Purpose Reflectometer.

### III • DISCUSSION OF RESULTS

#### 1. Composition.

In the investigation the titanium cover coat enamel, No. A1 (see Figure I) was taken as the base formula for studying the effect of modifying this type compositions. The best smelting, grinding, application, and firing practices previously determined for this enamel were used in studying these changes. In comparing the various enamels, no mill added opacifier was used and spray weights were standardized at forty-five grams per square foot. The opacity of this enamel is developed by the recrystallization of extremely small crystals of a titanium compound during firing, but the reflectance was not particularly sensitive to firing conditions.

Variations in enamel A1 were made until an improved composition was found, this was then considered a basis for further modification. In this present investigation, a complete systematic study of the composition was not undertaken, but spot checks or major changes by subtraction, addition, or replacement of the various components were made. Minor variations were made only when they were considered necessary.

#### A graphical presentation of composition changes

A graphical method (Figure I) shows these changes in composition as well as the color, gloss, reflectance, and best firing practice for each. The lines leading to the various rectangles show from which composition a par-

to Page 20 →

Figure 1 . . . . Pages 18 & 19

**Figure I**  
**composition changes and results**

BATCH		A1		MELTED	
Feldspar	-	5.0	Na <sub>2</sub> O	-	17.0
Quartz	-	28.6	K <sub>2</sub> O	-	.6
Soda Ash	-	27.0	MgO	-	1.8
Soda Niter	-	2.7	ZnO	-	24.8
Zinc Oxide	-	24.8	Al <sub>2</sub> O <sub>3</sub>	-	1.0
Mag. Carb.	-	3.8	SiO	-	31.9
Cryolite	-	2.9	Sb <sub>2</sub> O <sub>5</sub>	-	.8
Sodium Ant.	-	.9	Na <sub>3</sub> AlF <sub>6</sub>	-	2.9
Titanium Ox.	-	19.3	TiO <sub>2</sub>	-	19.3
Color-P	Gloss-1	Refl.-77	1525-3		

A 2	A 3	A 4	A 5	A 6
- 8 ZnO + 8 B <sub>2</sub> O <sub>3</sub>	- 8 SiO <sub>2</sub> + 8 Al <sub>2</sub> O <sub>3</sub>	- 8 Na <sub>2</sub> O + 8 B <sub>2</sub> O <sub>3</sub>	-2.9 Na <sub>3</sub> AlF <sub>6</sub> - 8 ZnO +10.9 Na <sub>2</sub> SiF <sub>6</sub>	- 17 Na <sub>2</sub> O + 17 K <sub>2</sub> O
Color - Y Gloss - 4 Refl. - 77.5 1525 - 2 1/2	Color - O.K. Gloss - 5 Refl. - -- -----	Color - P Gloss - 4 Refl. - 56 1500 - 2 1/2	Color - C Gloss - 3 Refl. - 76 1500 - 2	Color - O.K. Gloss - 5 Refl. - -- ---

A 14	A 19	A 20	A 21	A 23
- .9 Na <sub>2</sub> SbO <sub>3</sub>	-3.8 MgCO <sub>3</sub> +3.8 BaCO <sub>3</sub>	-3.8 MgCO <sub>3</sub>	-2.9 Na <sub>3</sub> AlF <sub>6</sub> +2.9 CaF <sub>2</sub>	-13.5 Na <sub>2</sub> CO <sub>3</sub> +13.5 K <sub>2</sub> CO <sub>3</sub>
Color - O.K. Gloss - 1 Refl. - 74 1525 - 3	Color - P Gloss - 1 Refl. - 72 1500 - 2	Color - P Gloss - 1 Refl. - 77 1500 - 3	Color - O.K. Gloss - 3 Refl. - 79 1525 - 3	Color - P Gloss - 2 Refl. - 69 1525 - 3

A 25	A 26	A 27	A 28	A 29
-3.8 CaCO <sub>3</sub> +3.8 SrCO <sub>3</sub>	-3.8 CaCO <sub>3</sub> +3.8 Bone Ash	-27 Na <sub>2</sub> CO <sub>3</sub> +27 Li <sub>2</sub> CO <sub>3</sub>	- 3 TiO <sub>2</sub>	- 3 ZnO
Color - C Gloss - 2 Refl. - 75 1500 - 2	Color - O.K. Gloss - 3 Refl. - 82 1525 - 3	Color - D Gloss - 5 Refl. - -- -----	Color - O.K. Gloss - 1 Refl. - 76 1500 - 2 1/2	Color - O.K. Gloss - 1 Refl. - 83 1525 - 3

A 39	A 40	A 42	A 45
-3 Na <sub>2</sub> CO <sub>3</sub>	-2.7 NaNO <sub>3</sub>	-21.8 ZnO -19.3 TiO <sub>2</sub> +43 ZnO.TiO <sub>2</sub>	-21.8 ZnO -19.3 TiO <sub>2</sub> +40 ZnO.TiO <sub>2</sub>
Color - O.K. Gloss - 1 Refl. - 84 1525 - 3	Color - O.K. Gloss - 1 Refl. - 83 1525 - 3	Color - O.K. Gloss - 1 Refl. - 84 1525 - 3	Color - O.K. Gloss - 1 Refl. - 84 1500 - 3

# COLOR KEY

Y - Yellow  
P - Pink  
C - Cream  
D - Dirty White

# GLOSS KEY

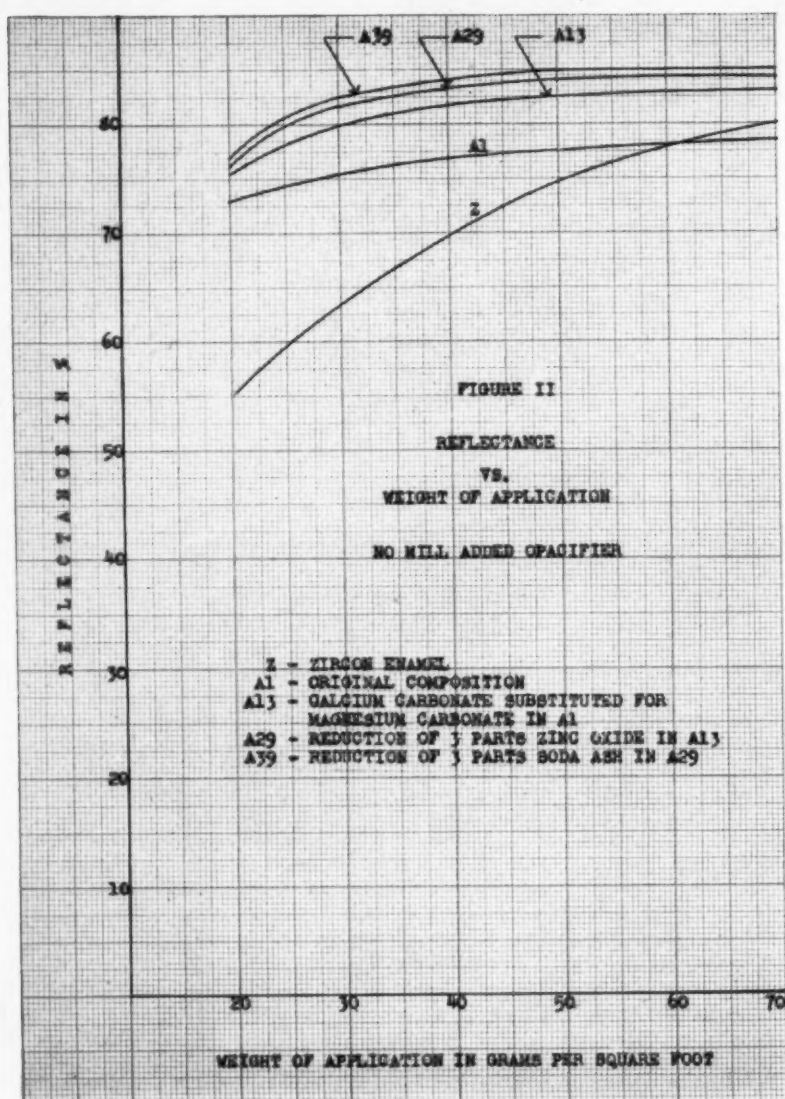
1 - Excellent  
2 - Good  
3 - Fair  
4 - Poor  
5 - Matte

A 7	A 8	A 9	A 12	A 13
-16 ZnO + 8 B <sub>2</sub> O <sub>3</sub> + 8 SiO <sub>2</sub>	+ 8 SiO <sub>2</sub> + 5.3 NaNO <sub>3</sub> -3.2 Na <sub>2</sub> CO <sub>3</sub>	- 24.8 ZnO + 8.2 BaO + 8.2 CaO + 4.1 CaF <sub>2</sub>	- 12.4 ZnO	- 3.8 MgCO <sub>3</sub> + 3.8 CaCO <sub>3</sub>
Color - Y Gloss - 4 Refl. - 48	Color - C Gloss - 1 Refl. - 74	Color - D Gloss - 5 Refl. - --	Color - D Gloss - 4 Refl. - 70	Color - O.K. Gloss - 1 Refl. - 82
1600 - 4	1575 - 4	----	1550 - 3	1525 - 3

A 15	A 16	A 17
- 4.0 SiO <sub>2</sub>	-2.9 Na <sub>3</sub> AlF <sub>6</sub> +5.8 Na <sub>2</sub> SiF <sub>6</sub>	-3.8 MgCO <sub>3</sub> +3.8 CaF <sub>2</sub>
Color - P Gloss - 1 Refl. - 73	Color - O.K. Gloss - 3 Refl. - 71	Color - O.K. Gloss - 3 Refl. - 78
1525 - 4	1525 - 4	1550 - 3

A 30	A 31	A 32	A 33	A 34	A 35
-2.9 Na <sub>3</sub> AlF <sub>6</sub>	-5 Na <sub>2</sub> CO <sub>3</sub>	- 6 ZnO	- 5 ZnO + 5 CaCO <sub>3</sub>	-10 ZnO +10 CaCO <sub>3</sub>	+10 Feldspar -6.4 SiO <sub>2</sub> -2.5 Na <sub>2</sub> CO <sub>3</sub>
Color - D Gloss - 1 Refl. - 72	Color - O.K. Gloss - 4 Refl. - 78	Color - P Gloss - 2 Refl. - 69.5	Color-OK Gloss -1 Refl. -70	Color-OK Gloss- 3 Refl. -74	Color- O.K. Gloss- 4 Refl. -78
1525 - 3	1550-3 1/2	1525 - 2	1525 -2	1525 -3	1550 - 4

A 46	A 47	A 44
- 21.8 ZnO - 19.3 TiO <sub>2</sub> + 37 ZnO.TiO <sub>2</sub>	- 21.8 ZnO - 19.3 TiO <sub>2</sub> +34 ZnO.TiO <sub>2</sub>	-3.1 Na <sub>2</sub> CO <sub>3</sub> + 5 NaNO <sub>3</sub>
Color - C Gloss - 1 Refl. - 75	Color - C Gloss - 1 Refl. - 70	Color - O.K. Gloss - 1 Refl. - 83
1500 - 3	1500 - 3	1525 - 3



ticular modification was made. Reference to this diagram will aid in following the discussion of results, however, since it is self-explanatory the diagram will not be described in detail. Only those compositions to which some particular significance is attached will be considered in the following discussion.

Compositions A2, A4, and A7 in which boric oxide was introduced were definitely off-color, dull, and with the exception of A2 had poor opacity.

In enamels A3 and A35, alumina was introduced by aluminum hydrate and feldspar. In both cases the gloss was very poor.

When the fluorine content was increased, or when either sodium silico

fluoride or fluorspar was substituted for cryolite it resulted in a loss of gloss.

In enamels A13, A19, and A25, the carbonates of calcium, barium, and strontium were substituted for magnesium carbonate. Enamel A13, using calcium carbonate was an improvement over A1. Its color was better and its reflectance was 82%, as compared to 77% for A1. The favorable effect that calcium seems to have on the color of this type enamel is shown in compositions A21, A17, and A26. In these compositions, the calcium was introduced as fluorspar and bone ash. The color was satisfactory in each.

Enamel A29, modified from A13 by subtracting three parts of zinc

oxide, was considered the best enamel developed in this investigation. The reflectance of this enamel was found to be 80 per cent at an application weight of twenty five grams per square foot. Its color, gloss, texture, and surface hardness were unusually good. Further reductions in zinc oxide as used in compositions A12 and A32 resulted in poor color and a considerably lower reflectance.

In enamel A28 a reduced amount of titanium oxide resulted in lower reflectance indicating that the chemical balance of this type composition has relatively narrow limits.

The highest reflectance was developed in composition A39 but the gloss and texture of this enamel were slightly inferior to A29.

In enamels A42, A45, A46, and A47 the zinc oxide and titanium oxide were introduced as zinc titanate ( $\text{ZnO} \cdot \text{TiO}_2$ ). Both the color and opacity deteriorated when less than 40 parts of zinc titanate were added.

During the course of this investigation, the occasional presence of small brown specks in the fired enamels were noticed. These brown specks were thought to be nodules or conglomerates of titanium oxide which remained in the glass and probably inverted to the brown rutile modification. There is also a possibility of the formation of a lower oxide of titanium. This condition can be helped in the following ways:

- (1) Premix the titanium oxide with the silica.
- (2) Introduce the titanium oxide as a compound. In this type composition, it may be introduced as zinc titanate.
- (3) Maintain oxidizing conditions throughout the smelting operation. The sodium nitrate present in the batch functions as an oxidizing agent.

## 2. Opacity.

The reflectance of this titanium type of enamel, where the opacity is developed by the crystallization of extremely small crystals of a titanium compound during firing, is unusually high even at low application weights. Figure II shows the reflectance curves of the original composition A1 and

the three key enamels, A13, A29, and A39 with no mill-added opacifier. The reflectance curve of A39 shows that this enamel has a reflectance of 80 per cent at twenty three grams per square foot, rises to 85 per cent at forty five grams and levels off at that point.

The relatively small and gradual rise in reflectance over the range of 30 to 70 grams per square foot is a desirable property. The reflectance values for A29 are from 0.5 to 1.0% lower than A39. Color differences due to uneven spraying or variations in the enamel thickness of various panels in an assembly should be considerably reduced in this type of enamel.

The opacity of A13 enamel was not improved with the addition of 2% opacifier to the mill. Reflectance curves for A13 with and without the mill-added opacifier were identical showing that the frit is practically saturated with regard to the opacifying particles. Figure III shows color curves of enamel A13 at 25 and 65 grams per square foot as recorded on a General Electric Spectrophotometer. The curve for the 25 grams per square foot application is very similar to that of the color curve for two coat applications of zircon enamels.\*

The scope of this problem did not include the identification of the crystals which form to give the high opacity, but considering the composition it is logical to suspect the development of some type of zinc titanate.

### 3. Smelting studies.

Several different trials were made to determine the best smelting practice. Early tests showed that both opacity and color were affected by improper smelting.

In order to measure temperatures accurately and to insure an oxidizing atmosphere, small batches of A13 were smelted in an electric furnace for various lengths of time at 1800°, 1900°, 2000°, and 2100°F. The frits were milled and applied to sample

plates at forty five grams per square foot to compare their color, opacity, gloss, and texture. The frit smelted at 2000°F. and poured as soon as a clear smooth thread could be drawn gave the best results. Oversmelting resulted in a substantial loss of opacity and deterioration of color. Under-smelting affected gloss and texture.

In another smelting study a 2000 gram batch of enamel A13 was smelted in a crucible from which small quantities of the melt were poured at various intervals. Tests on these frits substantiated the results described in the previous paragraph.

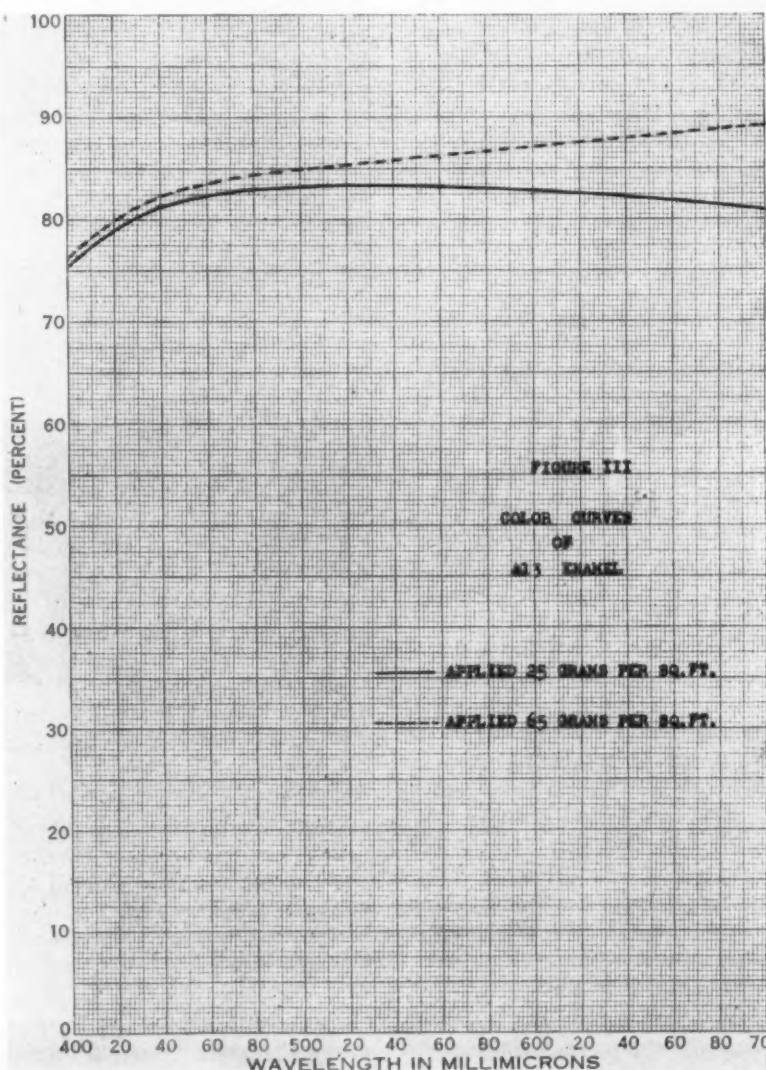
To prevent the reduction of the titanium oxide in the frit batches when smelted in the pot furnaces, the gas air ratio was adjusted so that an ox-

dizing atmosphere was maintained over the melt during the smelting.

### 4. Chemical durability.

The resistance of enamel A29 to chemical attack was determined by the spot test specified by the Porcelain Enamel Institute and by the Enamel Utensil Manufacturer's Council acid solubility resistance test for hollow ware. The spot test in which the enamel was subjected to a ten per cent solution of citric acid at room temperature for fifteen minutes showed Class D acid resistance. In the E.U.M.C. test in which the enamel was subjected to a boiling, six per cent solution of citric acid for 2½ hours, the weight loss was found to

to Page 74 →



\* B. King — "Antimony Vs. Zirconia Opacified Enamels" — *finish*, September, 1945, Fig. 3, Page 19.

# Have you investigated this market

## for porcelain enameled products?

Industrial stores—what they are and what they stand for

By A. McB. Colledge • PRESIDENT, NATIONAL INDUSTRIAL STORES ASSOCIATION

finish

Industrial or "Company" stores are rapidly coming to the forefront as important factors in the field of retail distribution. These stores, of which there are approximately 4,200 throughout the United States, are directly associated with and serve the employees of major industries, including the mining of coal, ore and precious metals, steel, lumber and textiles. Approximately 67 per cent are operated in conjunction with mining of coal and 15 per cent with the lumber industry. Generally they are distributed throughout the nation, although their greatest concentration is in that area east of the Mississippi river, following the contour of the Appalachian range, to the southern boundary of New York State. Their annual sales volume is close to a billion dollars.

### A market for porcelain enamel

These industrial retail institutions are peculiar to the American industrial system and are not found in any other country. Contrary to the impression their critics would like to implant in the minds of the public-at-large, they are, for the most part, modern up-to-the-minute retail establishments in every respect, employing recognized merchandising methods and equipped with the latest departures in fixtures and facilities . . . walk-in meat coolers, refrigerated meat, produce and frozen food display cases, scales and food handling equipment, *finished, for the most part in porcelain enamel.*

In normal times these stores stock some 20 to 25 thousand different items of merchandise, many of them nationally advertised brands. Their

stocks are advantageously departmentized, as a general rule, and comprise most everything from a penny box of matches to an electric refrigerator. About 60 per cent of their volume is in food . . . meats, produce and staple groceries, but the majority carry full and up-to-date lines of proprietary drugs and cosmetics, men's, women's and children's apparel, dry goods and notions, work and dress shoes, small hardware, *porcelain enamel* and aluminum kitchenware, furniture, floor coverings, stoves and electrical appliances, including, washing machines, ironers, refrigerators, food mixers, irons, radios and vacuum cleaners. Several companies engaged in their operation have even been known to handle automobiles and it is quite probable that, in the near future, several, at least, will take on a popularly priced line of prefabricated houses.

Industrial stores have an investment of approximately \$150,000,000 in buildings and real estate, \$75,000,000 in store fixtures and equipment, and \$500,000,000 in inventories. Their payroll this year will approximate \$75,000,000. They employ 5,000 executives and managers, 4,000 buyers and department heads, 25,000 sales people, 4,500 clerical employees and 2,000 deliverymen and truckmen . . . a total of over 40,000 persons.

### Architectural porcelain enamel too

In the past 15 years, during which these stores have made the most noticeable progress, their physical appearance, as well as their volume of business and their entire business philosophy have improved considerably. Originally housed in buildings of unattractive appearance, barnlike in architectural design, industrial stores of today present a very attrac-



ILLUSTRATIONS COURTESY  
"INDUSTRIAL RETAIL STORES" AND "COAL AGE."

tive appearance, with symmetrical exterior lines, . . . *some with porcelain enamel fronts*, . . . spacious, well lighted display windows. The interiors are tastefully finished in light attractive color combinations, with conveniently arranged display facilities; with fluorescent lighting throughout. In most stores a very unique

merchandising arrangement is employed; . . . since more than half of the sales volume is in foods, the food departments are usually placed in the rear of the store, with apparel, household furnishings and appliance displays nearer the front entrance, by which means the customers, in passing through to the food departments, are attracted to these displays and are

stimulated to buy merchandise other than foods.

The principal criticism directed against industrial stores, by overly zealous social reformers has been that they are, at best, un-American and uneconomic institutions, with no legitimate excuse for existence . . . that they prey upon the employees of industry, who are represented as their

unwilling but compulsory patrons. While some of this criticism may have had some justification in the distant past, it is not true today. In no instance, to my knowledge . . . and I have visited hundreds of these stores, is patronage of the store made a condition of employment on the part of any industry in connection with which they are operated. As a matter of fact these stores have acquired a very enviable reputation through having kept industrial employees well supplied with necessity merchandise conspicuous by its absence or scarcity in other retail outlets. They intend to fully capitalize on this reputation in the future by expanding their services to the point of attracting customers outside the immediate employees of those industries which they customarily serve.

It may be of interest to relate that a large part of the volume of industrial stores is sold on credit, both open charge and installment, with or without deduction over the payroll for employee customers. Recent surveys conducted by independent and unbiased research agencies indicate that approximately 75 per cent of industrial employees who are patrons of industrial stores prefer to have their store accounts deducted from their earnings because it greatly simplifies their household budgeting. However, it is becoming, more and more, the practice to resort to open credit, without deduction over the payroll, in order to remove one of the principal criticisms against such retail enterprises; so that, eventually, it will probably come to pass that deductions over the payroll will have passed into oblivion.

#### **Appliances normally sold on installment plan**

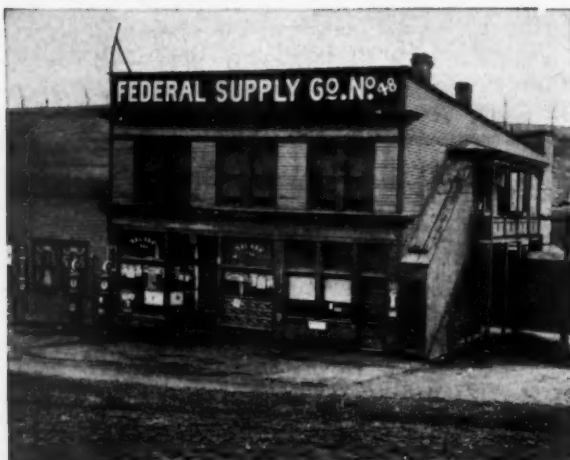
In normal times the sale of appliances, furniture and even clothing on the installment plan is resorted to extensively and as soon as Federal regulations on consumer credit are modified or removed, this type of promotional selling will be greatly expanded.

The National Industrial Stores Association, one of the most progressive trade associations in the United States, headquartered in Washington,



**YOUTHFUL CUSTOMERS** form part of the brisk business being done at this well-stocked coal company store at Welch, W. Va. Part of the store's contribution to better employee relations is courtesy and helpfulness, particularly toward children.

*Here is a market that should be of interest to manufacturers of all types of porcelain enameled products sold through retail channels. Opportunities are also presented for manufacturers of store equipment and architectural porcelain enamel for modernizing both interiors and exteriors.*



*This "before and after" photograph of a typical Industrial Store is that of the Federal Supply Company at Midland, Pa. Here's an opportunity for architectural porcelain enamel that should not be overlooked.*

D. C., with which more than 1,000 such stores are affiliated, has played an important part in the advancement made by this particular type of retail enterprise. This Association, although created sometime previously, became a very active influence during the N.R.A. period of 1933-34, in shaping the progress of industrial stores, through the education of its constituency in modern merchandising methods and ethical trade practices. Except during 1945, when war restrictions prevented, annual Conventions and Conferences have been held in key eastern cities, in connection with which extensive exhibits of prominent merchandise lines were maintained. In addition, regional programs of an educational nature have been conducted at strategic points and, during the war period pertinent information in the form of weekly bulletins respecting Federal regulations has been issued to its membership, so that they could be currently informed on all phases of wartime regulatory measures.

To fully appreciate the progress made by industrial stores during the past decade it is only necessary to compare some of the former type of "commissary" or "company" stores with the modern structures maintained by Inland Steel Company at Wheelwright, Ky.; Union Supply Company, affiliated with the United States Steel Corporation; Pittsburgh Mercantile Company associated with Jones and Laughlin Steel Company;

Federal Supply Company, a subsidiary of the Pittsburgh Coal Company; Koppers Stores, a Division of Eastern Gas and Fuel Associates and numerous others.

Ambitious and comprehensive plans are being formulated by the more

### *A. McB. Colledge*

is a leading authority on the nation's Industrial Stores. He has spent his entire life in the heart of the Western Pennsylvania coal fields, and is intimately familiar with company store operations. Associated with Koppers Stores for 17 years, he now holds the position of assistant treasurer and controller.

In connection with his NISA activities, he has visited hundreds of Industrial Stores throughout the country.

prominent companies engaged in the operation of such stores, for greater expansion of their facilities, both in additional units and size, as well as in merchandise lines.

### **A market to consider**

According to a recent release of the Bituminous Coal Institute, the consuming public will require, during the coming three years of reconversion, 500,000 deepfreezers; 8,000,000 electric refrigerators; 6,000,000 washing machines; 15,000,000 radiant heaters; 2,000,000 electric, gas and coal fired ranges, 5,000,000

stoves; 5,000,000 sewing machines; 6,000,000 vacuum cleaners; 1,000,000 electric fans; 15,000,000 electric irons; 5,000,000 toasters, 1,000,000 pressure cookers, and 20,000,000 radios, and in the manufacture of the majority of these appliances a considerable quantity of porcelain enamel is used.

To produce the above listed items alone will require, at a conservative estimate, 6,500,000 tons of coal . . . in fact, Bituminous Coal Institute estimates that 100,000,000 tons of bituminous coal will be required in the manufacture of the quantities of durable goods required by the consuming public during the next three years. It follows, as a natural conclusion, therefore, that since the consumption of coal promises to remain constant and since the majority of industrial stores are directly associated with the coal mining industry, a reasonable portion of the distribution of these appliances will be through these industrial stores, principally on convenient and easy credit.

Potential sources of supply will do well to cultivate this market which offers excellent prospect as a reliable, wide-awake, energetic agency for the distribution of consumer goods. Resident buying connections are maintained by a number of industrial stores companies in New York and buying contacts are maintained in Chicago, St. Louis, and other principal merchandise markets throughout the United States.

# Spraying - vs - dipping ground coat enamels

the pros and cons of a controversial enameling subject

By Paul E. Gerdes • PORCELAIN PLANT SUPERINTENDENT, A. J. LINDEMANN & HOVERSON CO., MILWAUKEE, WISCONSIN.

THE use of spray application of ground coat is not new, but its more extensive use in the past five or six years to meet difficult conditions should give it a definite place in more plants. The advantages to be gained by the use of the spray system application over a dip tank are several.

## Application and quality advantages

The use of spray application will eliminate all drain lines from cut-outs in any given shape, and also lines which may form from variations in neutralizers on the part. This is of extreme importance in some shops where standards of quality are high; and in cases where customers object to normal unevenness of finished surfaces due to drain lines from openings.

A further advantage derived in quality produced is that in spray application it is possible to apply top quality enamel to all surfaces of a part requiring a cover coat, which in turn produces a cleaner finished part. When dipping is employed, we can expect a progressive build-up of foreign material in our dip tank as dipping continues.

By progressive application to a piece we can attain a local color variation desired on a given part; that is, all edges of a part can be sprayed with a black ground coat while other areas may be given a normal ground coat, at the same time varying application thickness to meet follow-up process requirements.

On certain large parts, where it may be general practice to reinforce the back of the part in order to meet final flatness specification, application can be varied on the back side to make further re-inforcing unnecessary; that is, you can put the kind of material where you want it in the quantity required, and conform to the

contour of the part. However, this type of application is best confined to relatively plain shapes. On such parts as stove linings, which may have many hidden crevices, there is no advantage to be gained by spraying and the use of a dip tank is recommended.

It can be expected that stoning of ground coat lumps on parts will be



materially reduced by spraying application, but this is somewhat offset by the sprayer missing some area so that comparative rework required on ground coated parts will generally show in favor of a dipping method.

## Formulation flexibility

In spray application we are not confined to relatively narrow limits of enamel "set-up," but can consider set of enamel as secondary to advantageous mill additions. It is in the release from these requirements that greatest gains can be realized.

In the use of a dip tank it is necessary to keep set-up properties controlled closely with reference to set-up agents used, and specific gravity maintained to keep satisfactory working conditions. Soluble salts and clay content of a given ground coat mill

addition are often found taking precedence over the over-all working properties.

## Enamel defects control

To illustrate how defects can be controlled, a typical dipping ground coat mill addition is presented:

### Mill Addition "A"

Commercial Frit A.....	70 lbs.
Commercial Frit B.....	15 lbs.
Commercial Frit C.....	15 lbs.
Clay .....	7 lbs.
Feldspar .....	3 lbs.
Borax .....	3/4 lbs.
Mag. Carb. ....	1/4 lbs.
Bentonite .....	1 oz.
Water .....	45 lbs.

Milled to fineness of five to seven grams per 50 cc sample on 200 mesh. Enamel used at a specific gravity of 1.63 for dipping weight of 1 1/4 oz. per square foot.

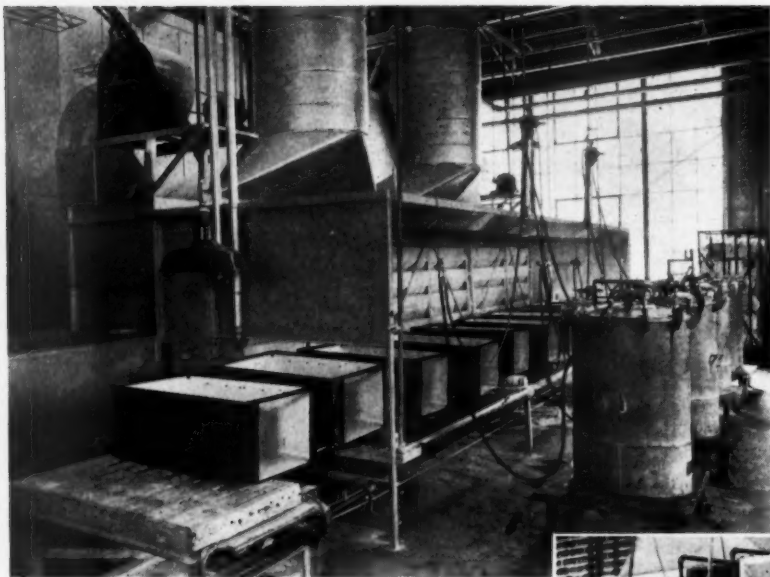
As a comparison, a typical spraying enamel addition can be:

### Mill Addition "B"

Commercial Frit A.....	70 lbs.
Commercial Frit B.....	15 lbs.
Commercial Frit C.....	15 lbs.
Clay .....	5 to 7 lbs.
Feldspar .....	7 to 3 lbs.
Borax .....	0
Mag. Carb. ....	1/4 lb.
Bentonite .....	1 oz.
Sodium Aluminate.....	4 oz.
Water .....	40 lbs.

Milled to fineness of two to four grams per 50 cc sample on 200 mesh, and at a temperature not to exceed 90° F., using pressure tank to spray at specific gravity 1.69 to 1.73.

The mill addition "A", used under borderline shop conditions of continued high relative humidity can be expected to produce a ground coat that will be susceptible to re-boil, black edges, blisters, burned off



PHOTOS COURTESY THE DE VILBIS COMPANY

*Above: A typical installation of a centrifugal type water wash spray booth. Right: Spraying is sometimes employed for both ground coat and cover coat enamels on washing machine tubs.*

edges, and the accompanying defects of local sliding and black-specks.

The mill addition "B", using identical commercial frits, but using a mill addition without regard to set-up obtained further than that it will apply satisfactorily by spraying, can be expected to produce an enamel that will be free from re-boil tendencies, black edge blisters, or local sliding and black-specks, due to working of ground coat, when used in parallel with addition "A".

The difference in the action of the two enamels is directly traceable to a change in soluble materials in the mill liquor. It is more a case of type of materials present than quantity. It will be noted that borax is eliminated from the enamel "B", the reason for this being to maintain the  $B_2O_3$  content of mill liquor at the lowest possible point. The top mill temperature of  $90^\circ$  is suggested because milling at temperatures above this point, the  $B_2O_3$  content of the mill liquor will show a rapid increase, and even though no borax is added in the mill, sufficient will dissolve to produce re-boil. If additional set-up is required, it is suggested that some agent such as sodium aluminate, sodium nitrite, or potassium carbonate

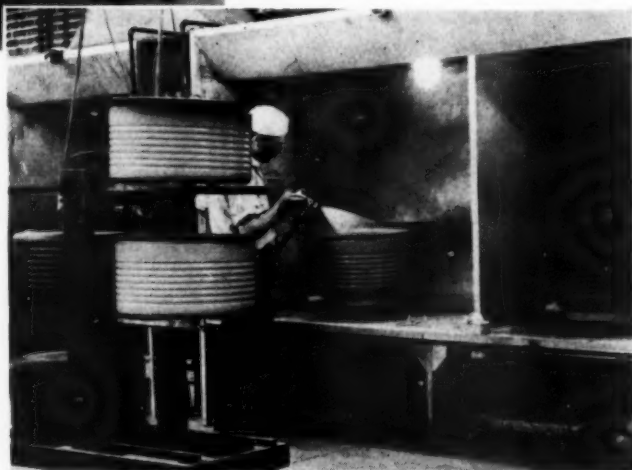
be used. It is believed that the  $B_2O_3$  content of the ground coat mill liquor is a controlling factor in re-boil tendencies of ground coat.

It is suggested that clay content be reduced in a range of seven to five pounds per 100 lbs. of frit in order to produce an enamel which will stand a sharp fire. For each per cent reduction of clay we can usually add 2% of feldspar or similar material in order to maintain top firing temperature.

#### Equipment

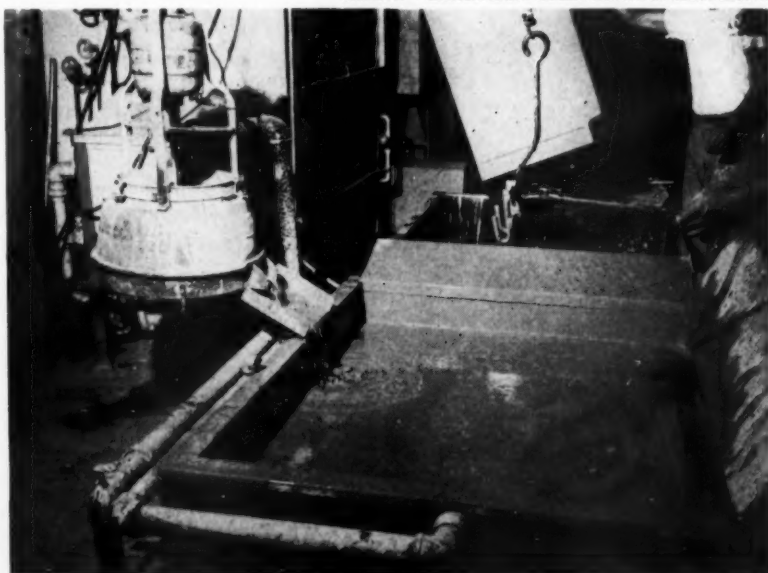
The equipment requirements of a complete ground coat spray applica-

to Page 72 →



*Below: Photo of large circulating ground coat tank for dipping "one-piece" stove bodies. Notice provision for screening the enamel in this system.*

finisfoto — COURTESY EDISON GENERAL ELECTRIC APPLIANCE MFG. CO.



# Case histories of architectural installations using porcelain enameled steel

in California or Alaska the story is the same

*By Elsa Gidlow* • SAN FRANCISCO CORRESPONDENT FOR FINISH

FRANK ALLEN, of San Francisco, who describes himself as "raised in the tile and terra cotta business", is one of the West Coast's unshakable enthusiasts for architectural porcelain enamel and through his recently organized Architectural Porcelain Constructors he expects to see, in this first year of operation, "twice as much business as we did in our best year before the war, even without trying much and with the handicaps of limited materials and lack of skilled men". Already this new organization has half a dozen interesting architectural jobs started or about to start, and an interesting point is that jobs Allen handled — under another organizational set-up — as far back as ten years ago, are proving to be continuous "salesmen" for new ones.

Before the war, Allen's operations were handled through his Frank Allen Co., which suspended to take on war work. Before that, he worked through the Ferro-Porcelain Building Co. Although most of his war-time work was outside of the porcelain enameling industry — he took on a great deal of fabrication on Government jobs — he was able to do a certain amount of work in his own field, mostly bulkheads, and some sanitary ware for ships.

Just about a year ago, along with several associates, Architectural Porcelain Constructors was organized, with headquarters at 461 Market Street in San Francisco. Promotion of structural porcelain work is the prime objective of the new company, which will manufacture and contract for porcelain enamel jobs, but in addition it is developing and experimenting with a few specialty items which may later be placed on the market.

A building is being erected in Oak  
finish JANUARY 2, 1946

land which will contain the firm's offices, an engineering department, and a fabrication shop. Enameling will be jobbed out. They will also furnish porcelain enamellers with fabrication on signs from the new plant.

## Tell potential customers the facts

"What is greatly needed in our industry," Allen says, "is an organization or association comprised of all who are interested in and concerned with porcelain enamel as an architectural facing, to tell our potential customers the facts about our material. Those interested in other materials are doing it — with what success we are well aware — but even those who should know remain ignorant of the advantages of structural porcelain. All of us who have worked with the material over the past decade have performance stories to tell that could be used by all in the industry. We need a central place to shoot such experiences into; and we need to spend some money to tell the whole story to the public." Allen's group is beginning to tell it's story to architects, constructors, and potential builders in industry, using as examples the jobs in this area that are standing advertisements for porcelain construction.

"I have been working with the material since 1934," Allen says, "and I have never had a complaint on material failure". On the other hand, he says, some of this region's finest buildings, utilizing other much-advertised materials (terra cotta, tile, glass) have cost and continue to cost large sums for maintenance."

## Case histories favor

### porcelain enamel

Based on his previous jobs, Allen has some interesting case histories which are being used in Architectural

Porcelain Constructors' promotion and selling efforts.

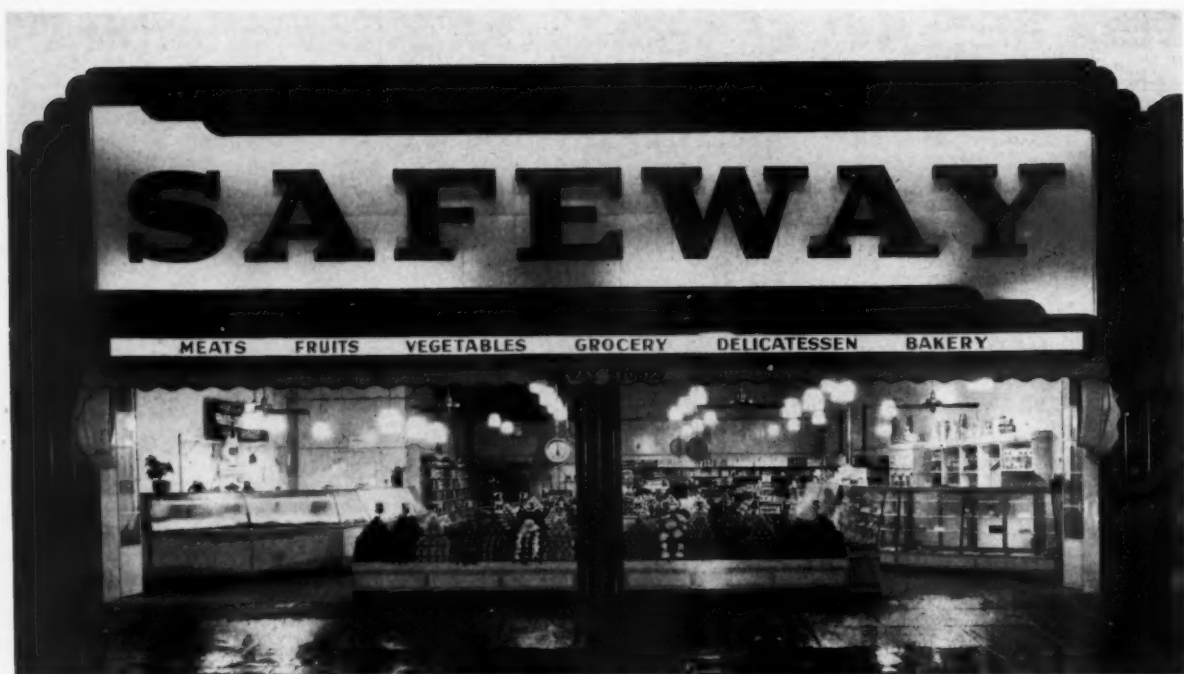
A building owner in Stockton for whom Allen has started three new buildings to be used for retail stores, all constructed for porcelain enamel facing, didn't have to be sold very hard after he sat down and figured out that in six years he has spent \$700 for maintenance on a building with a \$3000 glass job. This man is a fairly large owner of property. He has tried tile, glass and terra cotta in an attempt to find a building surface that will be reasonably permanent, that will withstand the climatic conditions, and will not eat up profit margins in maintenance. Allen believes that this man's experience with porcelain will make him a strong supporter.

Marble might seem like a safe and sound material for a mild climate like that of the San Francisco Bay Region, as well as a permanent one low on maintenance costs. Yet the fogs and salt winds cloud and coat it to a dingy appearance and building owners find they must spend a good deal keeping it cleaned and waxed in order to preserve surface and looks. The weathering causes terra cotta to fly off — a problem (and hazard) that owners of some of the most important buildings here have to contend with.

"But go out and look at the buildings on which porcelain enamel was used and without exception you find them standing up better than any other surfacing materials, bar none."

## Railroad uses porcelain enamel

In 1942 the Union Pacific Railroad's ticket office at Geary and Powell Streets was remodelled and the first story frontages on the two streets faced with porcelain enamel. The Road's Streamliner train colors were used — orange, red, and slate



*"The two porcelain fronted Safeways are the only ones in this region with the bright original colors."*

grey, giving a highly effective appearance. The surface is kept well washed and presents a constantly new appearance. Just recently the company ordered the facing of the second story to match. Allen, who handled both jobs, says proudly: "You can't tell the old job from the new one — the

former looks as clean and bright as the one we have just put up."

Another interesting example that Allen uses in his promotions is that of two Safeway stores in Oakland. This company with its chain of grocery stores has buildings in brick, terra cotta, painted wood, and many

other materials, but it must maintain as nearly as possible for advertising purposes a standard color scheme of red with cream and black. The two porcelain fronted Safeways are the only ones in this region with the bright original colors the company features, and, says Allen, "they are

*"Completed in 1937 — as clean and bright in effect as the appliances displayed in the windows."*



still the two best looking stores they have". The jobs were done in December, 1935.

A job completed in 1937 — store of the Gernhardt-Strohmaier Co., who specialize in stoves and heaters — continues to present as clean and bright an effect as the appliances displayed in the windows. This striking store with rounded corner and frontages on two streets is faced in cream and maroon with green trim. During the war one of the executives of the business called Allen on the telephone and said the surface looked just as good as when it was new. Evidently

For this corner building an almost "tweedy" effect suitable to the garments displayed, was obtained with a three-color mottled surface, the upper part of the front predominantly buff with reddish-brown, and the design of the saluting girl figure a Spanish red on a buff field. Tubing behind the figure, and behind the porcelain enamel letters of the store name make them stand out brilliantly at night. The store front is kept well cleaned. "I saw it a few months ago," Allen says. "It looks the same as when we put it up".

One of the spectacular jobs from

but despaired of finding a material that would survive freezing and blistering temperatures and the alternating between extremes which causes many materials to crack up. The porcelain enamel frontage for the two story building was frankly an experiment. It has been watched with keen interest by people in the industry. Six years have gone by. The owners wrote Allen a short time ago to say that the six summers and winters have not yet altered or harmed the surface, that "it looks the same as when it was put up".

These are only a few of the porce-



"... is kept well cleaned." — "I saw it a few months ago. — It looks the same as when we put it up."

finding it hard to believe that no maintenance was required, the owner wanted to know if the joints between the blocks should be inspected. Allen assured him he was not worried about the joints failing. "That was a couple of years ago; I saw the building recently and it looks the same as ever."

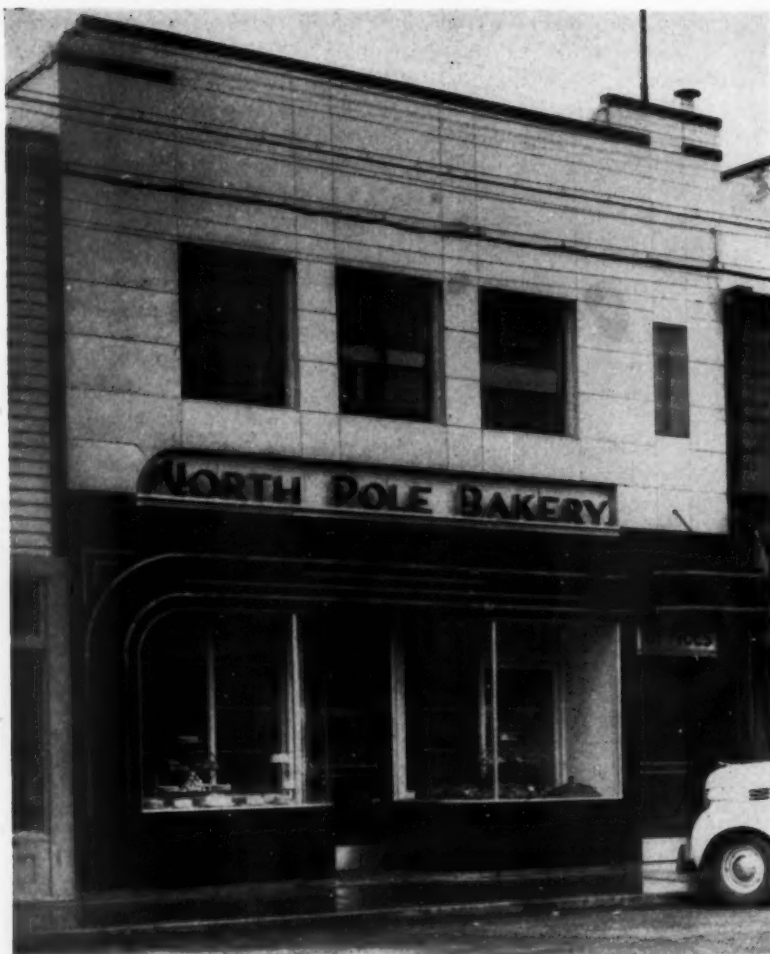
#### Mottled finish used effectively

In Long Beach is a large retail clothing store for men, Timely Clothes, another job Allen contracted.

the point of view of a maintenance record under the harshest possible conditions is that of the North Pole Bakery at Fairbanks, Alaska. Building and building facing materials constitute a serious problem in a climate where temperatures range in a year from 70° below zero to 90° above. The business house owners in desperation stick to wood and corrugated iron. Owner of the North Pole Bakery wanted something with a better appearance that would advertise the fresh cleanliness of a bakery shop,

lamin enamel case histories. There is the instance too of a porcelain enameled service station in Oakland that was moved from its original location to another site without any damage or cracking, which may be considered something of a record. This was a Ferro Porcelain Enameling Co. job.

If people were told some of these histories, Allen says (and he calls himself "rabid on the subject"), there would not be much difficulty in selling architectural porcelain. "Such promotion need not be carried by the



*"Building and building facing materials constitute a problem where temperatures range in a year from 70° below to 90° above—six summers and winters have not yet altered or harmed the surface..."*

frit companies or the steel companies exclusively. If everyone concerned would put in a fair share, it would not cost any individual or group very much to tell the industry's story as it should be told, on a nationwide basis," according to this enthusiast. "At present, each single one of us has to get in and sell every job because people generally don't know about the advantages of our material. All of us who are doing good architectural work are using substantially the same methods. We know we have to have a pan-formed piece, cemented to a good stiff backing to take out the biscuit, the pieces must be attached to the building with some form of rust-proof clip. We have a standard product to sell and we should be telling the facts about it as an in-

dustry instead of individually."

#### **Fireproof panel "backing" considered essential**

Allen himself, before the war, had developed what he considered a "better porcelain enamel pan construction", with his own patented clip for fastening the material to the structure. Lately, his panels have been rendered fireproof through utilization of a cement type bonded fibreboard backing. The board is cemented to the porcelain panels under pressure. Fireproofing and elimination of the "biscuit" are not new, but the very light weight of this solid porcelain enameled panel is an added advantage, Allen says, and its fireproof feature a good selling point.

This improved panel will be used

in the new jobs Allen is undertaking at present. Almost completed is a remodelling job for the Sutter Hotel in Oakland, with frontages on 14th Street and on Jefferson. The 80-foot Jefferson Street facing will be finished by the time this article is in print, and possibly the 18-foot front on 14th Street. The effect is a red reeded base course above cream with red striping. There will be a round reeded column in corner entrance and matching reeded columns at fronts of a restaurant at one end and a bar at the other end of the frontage. Work is progressing now on the hotel entrance which will have a green base and marbled effect. Fluted columns will harmonize in reverse effect with the reeded columns. A porcelain enameled marquee will have the hotel name in porcelain enameled black letters. These will be hollow-face with light tubes inside.

At Stockton, Allen's group is midway on a job due for completion about the first of the New Year which includes three new buildings of one story each. Those buildings—constructed for the property owner mentioned earlier in this article who became disillusioned with rival materials because of high maintenance costs—will house four retail establishments. A hardware store will occupy the first, finished in maroon and cream; a dress shop will have a suntan and black color scheme; two shades of green will face the third store, for which a shoe retailer was negotiating a lease; a drug store will have a dark red and cream front. Fireproof 16 x 26 inch panel blocks are being used for the entire 150-foot frontage.

Allen also has contracted to remodel early in the year a drug store in Oakland which will emerge with a colorful front (50' on one street, 70' on another) dark green at the base with yellow above and a Chinese red trim.

A beauty school building with a beauty salon and a bar on the lower of its two floors, situated in downtown San Francisco, will blossom with colorful fronts in another interesting

to Page 72 →

# Progressive purchasing policies

candid comments for both buyers and sellers of materials and components

*By F. H. Guthrie* • PRESIDENT, NEWARK STOVE COMPANY, NEWARK, OHIO

I AM NOT going to attempt to say I have a cure for your purchasing problems. I will simply discuss some of the factors which we, at Newark Stove Company, have found to be essential to achieve best function for all of our departments. You can say, "Why that is only common sense!" I agree. Another thing we can agree on is that today we are in a "suppliers market". Although the fundamental principles are still the same I believe you will further agree that the basic purchasing problem has changed.

To be sure it is stated that our Country could not have won the war so quickly, or so effectively had it not been for our Priorities systems. This statement has been repeated over and over again, but frankly no one really knows that it is true. For instance, had the steel industry, aluminum, chemical and other raw material industries been informed of the anticipated requirements, they perhaps would have performed better than the War Production Board and with more dispatch. The statement is at least debatable.

## The lessons of war

Now let us review the facts. The Government, through reports furnished by industry, decided that a given quantity of certain raw materials would be obtainable within a definite period of time. At the beginning of the past emergency they found that this available supply was wholly inadequate and arrangements were made, in some instances I understand, against the recommendation of the representatives of industry, to build new plants so that sufficient raw materials would be available to meet the demand. The available raw material, regardless of whether sufficient or not had to be distributed by WPB among the various branches of the

service, namely Army, Navy, Maritime Commission, Air Forces, Lend Lease and essential Civilian Requirement. The service branches in turn redistributed materials to meet their various needs in the order of their urgency. The system, we admit, was sound, but the organization problem and personnel requirement was tremendous. It is possible that industry with adequate information could have handled the problem with less expense and more expediency. We in industry now have our chance to prove this little point and we find that industry can not or will not remember some of the lessons learned during the war, the most important of which we believe to be cooperation.

There is no place in the premiss of true cooperation for the words greed and selfishness. They just do not exist for if they do, you can not have true cooperation. For example, we are currently faced with a definite shortage of finished steel, one of the nation's principle raw materials. Since VJ Day, and without consideration of the subsequent strikes and slow downs, we are attempting to produce more durable goods than were produced immediately prior to the war. This shows a definite lack of foresight or just plain greed. There is a market for everything and anything today, we all know it, so we are each attempting to be the first to place our goods on this market.

## Coordinated industry planning can prove advantageous

Each industry has its trade associations thru which general facts and figures may be discussed and joint plans made. The availability of various raw materials can be ascertained and I might say that according to past experiences only a few items would have to be considered. With this information at hand and with planning

done accordingly, industry as a whole would not be fighting to obtain its share of the unobtainable.

I have mentioned these facts as we are all guilty of the normal tendency to fight for our selfish requirements. It directs particular attention to one thing, and that is government control of industry. You might take exception to the words "Government Control of Industry", but what else would you call Priorities. The Government tells you how many units to make and when to make them. They give you assistance to obtain the necessary raw materials and they also help you determine the selling price. I haven't mentioned labor, but they tell you what to pay your employees and hint at increases to these employees which must not affect the selling price of the product.

We, in our relatively small operation, have found some benefits under government regulations that were well worth continuing.

- (1) Rigid material control. Under CMP your critical material stocks were limited, you could only carry sufficient quantity for 30 to 90 days, depending upon flow time as well as scarcity. Consequently the stock turn over was good and the investment was held to a minimum. This control certainly had its merits.
- (2) The necessity of maintaining better records. You may say, well, good business demands that you do these things and I agree, but the facts clearly indicated that some of the most substantial companies did not have the records and the control that they should have had. We do not take the credit in our plant, it belongs to W.P.B. We merely saw a good thing and adopted it.

There is another favorable point which developed from our experience with government control. During the war we rarely had a work stoppage caused by lack of material and if one did occur it was of short duration.

Well, so much for government regulation, I don't like it — you don't like it — so we should forget it. It wouldn't work today with the various strikes, current and pending anyway. But we should be a trifle more sane in production planning and less greedy in our desires. We would all live longer, particularly the Works Managers and Purchasing Agents.

#### **The P.A. has his chance**

Today is the time for those who have made purchasing their profession to prove to management as a whole that their department is an asset and not a liability. They not only must keep a sufficient stock of the right quality and at the right price on hand in time for production, but must also know their vendors' production problems or limitations.

To do this, of course, we must first sell the vendor on the idea. The selling of the vendor the idea that he is part of your organization is not a difficult task. The purchasing department must first receive the complete support of his own company. Its integrity must be beyond reproach and he must at all times be fair and equitable.

Suppliers should be considered a department of your shop. However, some people still consider suppliers as peddlers. The Sales Representative of our suppliers are in many cases our *Production Managers*. We are today planning production in conjunction with our suppliers, so therefore they must become an integral part of our production department. In many cases their engineering is the base from which ours is developed. When we once find this to be true we treat these men as part of our own personnel. In this treatment what do we attempt to do? First of all, you would not allow your own personnel to sit on the *soft benches* in the front office for an hour or two. Secondly, you would want to know him personally, maybe socially, but

again would you expect a department head in your shop to wine and dine your Purchasing Agent once or twice a month? Certainly not! Another thing you would not want to do is, if you found yourself short of material, call the supplier and reverse the charges. Third, what is the capacity of the representative?

#### **Choose your suppliers carefully**

Not all suppliers warrant your business — do business whenever possible with people who do warrant your business. Suppliers who do not follow basic engineering and are not morally responsible can break you or any company.

When proper supplier relations have been established, then the responsibility for the planning and timing of purchases is up to our company procedure.

It is some of these procedures at the Newark Stove Company about which I would like to speak. They may or may not fit your operations. Your own policies may be better than the ones we have established.

#### **Duplicate, triplicate — quaduplicate orders!**

First, do not gamble on the market beyond your known requirements. Today, I am told, management in some instances has approved or at least permitted their purchasing offices to place duplicate, triplicate and perhaps quaduplicate orders with various companies with the thought in mind of cancelling all but one, namely, the first to deliver. This isn't fair to the vendor. It throws a hardship on their production department and provides a distorted picture of sales potential. It also aggravates an already bad raw material shortage situation. It is not "doing unto others as you would have them do unto you" and, therefore, will not help to cement the vendor-customer relationship.

I was told of a store having seven franchise with seven different radio manufacturers. This store expects to cancel all but one and that one will probably be the first to deliver.

I was also told by one of our vendors that they intend writing each of their customers notifying them that

they consider all orders bonafide, not subject to cancellation, and that should their customer find that they do not require the merchandise ordered it should be cancelled immediately.

#### **Long range planning is necessary**

The Planning Department instigates all requirements for productive materials. During the war the government insisted upon long range planning so that orders could be placed on schedule and vendors could in turn establish their schedules. Today this same action is desirable, but it should always be done in a business like manner and kept under control.

Establish from experience percentages for shrinkage. Planning should include them in initial requirements.

Quantities are established from double checked bills of material by models or combination of models.

There are exceptions to this procedure. On items where quantity governs the price, requisitions for such items are increased by the Control Department based upon the total quantity required for planned production. Such increases are approved by Engineering, Production and Purchasing before action is taken. By following this procedure it is relatively easy to adjust shipping schedules of the vendors when such adjustments are required.

The material flow time is established by purchasing in advance of productive planning. Our production planning is entirely predicated upon this factor. Present flow time is, of course, both irregular and out of line with normal conditions. We expect the situation to continue for some time. To give you some idea of the problems with which we are faced on flow time, as of November 25th, here are a few examples:

At the present time we find the following lead time required before we can expect deliveries on various materials:

Steel .....	4-6 months
Copper Products .....	2-4 months
Aluminum Products .....	2-4 months
Simple Accessories .....	2-4 months
Complex functional Accessories .....	4-6 months



*"Where quantity governs the price . . . increases are approved by Engineering, Production and Purchasing . . ."*

Here again the representative of an established supplier is very helpful. If he functions properly he can help to analyze your planning to insure proper correlation with his company's facilities.

**"Inventory control" checks first  
then clears to "purchasing"**

The Inventory Control Division handles all requisitions before they clear to purchasing. This division assigns all material to "Factory Orders" which are set up by production planning before any material is ordered. A quantity of material always keeps its identity as to commitments and factory orders until converted to finished merchandise. This procedure was necessary while we were operating under material control planning by the government during the war. We found these controls by Government annoying, the same as you did. However, we also found benefits from the plans.

Our work during the war necessitated the handling of a multitude of items, and at no time were we held up for lack of material for more than 24 hours. We were always satisfied to turn our productive materials five or six times a year in normal times. In 1943, we were able to turn our

inventories 11.15 times and in 1944—14.7 times.

Inventory Control constantly checks shrinkage as set up in production planning. This control cuts down dead end inventories. Overages are picked up and reassigned after factory orders have been completed. Frequently we are able to reduce purchase commitments on future requirements, thus reducing dead end inventories. In Inventory Control we have very few maximum and minimum controlled items. The only items controlled on this basis are those which engineering set up as standard materials, such as; hardware, nails etc. This control point is also responsible for maximum and minimum quantities. Careless handling of maximum and minimum procedure can very easily increase dead end inventories.

**Let suppliers see your  
engineering specs**

In addition to the mechanical facilities provided by the Planning Division, together with the Inventory Control Group as already outlined, it has been our further experience that all engineering specifications should be developed in close cooperation with our suppliers. The establishing of proper specifications re-

quires a clear cut understanding of our vendors' production facilities, as well as all fundamental limitations which affect the established specification which we expect to be met. This in turn demands very close correlation between the Engineering functions and the Purchasing Department. This point is particularly important as our business becomes more complex through the development of more involved manufacturing processes and the increase in complication of mechanical requirements of our products and their purchased components. The purchasing function can be greatly simplified by the establishing of sound specifications tied in with the specific source involved for the supplying of purchased parts.

**Four points for a sound  
purchasing policy**

In summary I would like to again emphasize those points which we consider most essential to the establishing of a sound and progressive purchasing policy:

1. The selection of a sound and economical source.
2. The working in close cooperation with the source which is a vital component of your business in that a

to Page 72 →



# RESEARCH

guest editorials

by

*R. M. King & A. J. Andrews*

ASSOCIATE EDITORS



## Some suggestions for future enamel research

*By Professor R. M. King* • OHIO STATE UNIVERSITY, COLUMBUS, OHIO

A FEW years ago Thomas Midgley coined the slogan "Science is Power." The blast at Hiroshima added an exclamation point and opened the minds of the doubters and unbelievers to the realities of this slogan. "Now every man, woman and child knows that the fate of this nation rests on the scientists."

But we should not emphasize the more dramatic developments to the exclusion of those which may be even more important, that is those which implement our slogan. Under date of July 1945 the now famous Bush Report—"Science and the Endless Frontier"—was issued. This report was developed from the findings of a committee appointed late in 1944 by President Roosevelt and urges federal financing of fundamental scientific research. As of the date of this writing two bills which are intended to carry out these recommendations are being considered by the Congress.

Few will challenge the statement that enameling technology has made more progress in the last 25 years than in all its previous history, and few will deny that this progress is attributable to research of one type or another. Since the value of research has been recognized in the enameling industry, it is inconceivable that this industry will not at this time multiply its own efforts in research and development. It seems timely, therefore, for one to offer a few suggestions as to what trends enamel research may profitably take.

It is believed that enamel research of the future should pursue three general lines: (1) further development of tests, (2) research on plant processes and equipment, and (3) fundamental research.

### Development of tests

During the last 10 years two industry-sponsored programs for test development have made important contributions to the progress of the industry. Tests are the measuring sticks of the quality of products and as such they put an industry on a quantitative basis with respect to its quality and enable it to make guarantees with respect

to its products. Development of tests is not a spectacular type of research, but tests are essential to all types of research and hence are necessary if maximum progress is to be made. It has been said that "advances in physical sciences depend upon advances in instruments which scientists employ." Development of tests imply the existence or development of equipment to carry them out.

The value of tests in the enameling industry is pointedly illustrated in our present methods for determining the thickness and reflectance of cover enamels. A thickness gauge enabled the industry to discover that chipping is more frequent where the enamel is thicker than a standard minimum and that replacing of such parts is more costly than scrapping them. Along with a thickness gauge, instruments for measuring reflectance were developed and tests were standardized. By using these tests and instruments together the industry has been able to reduce markedly the amount of enamel required for properly covering the ground coat, to develop enamels having super opacity, to decrease the proportion of rejected parts, and to increase the proportion of one coat ware. Who can estimate the savings?

As our test development program stands several tests have been recognized as standards, some as tentative standards, while others are in the stage of development. Still others, however, are essential.

### Plant Processes and Equipment

A progressive industry is continually in need of a proving ground for new products, processes, and equipment. Frequently in the enameling industry the need arises for plant tests on new enamels, new steels, new methods of processing, and new equipment. For the most part plant proving is done on regular production lines which present many disadvantages. Production men dislike to have their schedules interrupted. Also, the production line available may not be suitable to a fair test of a given piece of equipment. One of the first infra-red driers was reported to be unsuccessful because it could not be installed

and operated under favorable conditions. Hence tests on good products may fail because of poor testing conditions. It would appear therefore that the industry might well profit from a pilot plant subsidized by the industry and made available to all who would contribute to its installation and maintenance. In such a plant semi-production tests could be carried on without the limitations, restrictions, and annoyances of regular production lines.

#### Fundamental Research

Someone has said that "Pure Science" is the early 'spade work' stage of applied science." Following out this thought we might say that fundamental research in enamel technology supplies the raw material for the

development of the products of the industry. Hence fundamental research should not be neglected. This statement is underlined by the "signs of the times." Some fundamental research has been done in university and government laboratories, but the amount has been all too small. New knowledge, new methods, and new equipment are available in the fields of pure science and should be applied to enamel research.

Research in technical lines implies the employment of men having specialized training. This recalls the many statements of recent months regarding the present and prospective dearth of trained scientists. Too much cannot be said in behalf of more men and better training until the need has been met, for "time is running against science."

## Attention "Mr. Executive"

*By Professor A. J. Andrews* • UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS

THERE is much talk about research in the Porcelain Enameling industry, but only a few do anything about it. Does your company have a plan? With the demonstrated power and value of research, no industry can afford to neglect it. It is an investment in the future and is considered so important by the government that the expenditure is exempted from taxes. All large companies have research departments as they consider that their very existence depends upon it. Many small companies group together and finance cooperative research.

#### Two per cent of gross sales for research

The many companies furnishing data to the National Resources Planning Board show that an average of two percent of the value of their total sales is allocated to research. Using this as a basis, a company doing a million dollar gross business could afford \$20,000 per year for research. This is enough to finance a very ambitious research program and if properly spent should bring valuable results, in new and improved products, better production and control, all of which would contribute to a lower cost-value ratio.

Research, however, cannot be bought like a commodity by merely allocating the funds. It requires careful planning and the selection of the director with executive as well as research ability is the most important step in a successful program. This man must know the industry, its problems, and its possibilities for growth and expansion. He should be able to formulate a research policy for the company and then carry it out. He must have the confidence of management. The whole program should be in his hands and he alone should decide the manner of carrying it out. Too often a research organization degenerates into an impotent force because of managerial or production interference.

#### Research should be an independent department

Research should be considered an independent department

finish JANUARY • 1946

ment which will cooperate with other departments and consult on plant problems and in forming company policy. The long time research program and policy, once approved by management or the board of directors, should not be interfered with except by major changes in company policy.

In most cases the organization is set up to conduct all of the research of the company. However, it may be considered desirable to employ part-time consultants or the services of research laboratories for certain problems where special experience or talents are needed.

#### Give budget problems to the laboratory director

The distribution of the budget for a research department is obviously influenced by many factors. If, however, a capable director is selected this should be his problem.

#### Suggested Budget for a Research Department

Director of Research .....	\$8,500.00
Research Assistants (2) .....	5,500.00
Secretarial service .....	1,500.00
Operating expense .....	2,600.00
Books and periodicals .....	200.00
Overhead .....	1,500.00
Miscellaneous .....	200.00
	<b>\$20,000.00</b>

Small companies can advantageously invest in research in a number of different ways. A one man research department may in some cases be feasible and valuable results have been obtained where one good man has only devoted part of his time to research. Even in such cases, however, a definite research policy should be adopted. Other methods by which small companies can obtain the values of research consist in assigning the work to an outside research laboratory, or by cooperating with other small companies in special industry research projects.

# The seventh annual P. E. I. Forum

a report—plus authors resumé of papers

ONE hundred sixty-six men interested in the improvement of plants and processes in the porcelain enameling industry attended the Seventh Annual Forum of the Porcelain Enamel Institute at Ohio State University, Columbus, Ohio, November 28, 29, 30.

This was the first Forum that has been held for four years due to the war. Feeling that there would be some new faces among those responsible for enameling plant activity and that many of the old timers would be somewhat "rusty" as a result of contrasting war time work, the Forum Committee arranged the program as a "refresher" course on fundamental subjects pertaining to enamel plant operation.

The Wednesday morning session was taken up by registration, with a general session starting in the afternoon of the 28th under the chairmanship of Prof. R. M. King of O.S.U. Following an address of welcome by C. E. MacQuigg, Dean of the College of Engineering at O.S.U. and response by R. H. Turk, President of the Porcelain Enamel Institute, the meeting got under way with the first paper "Preparation of Sheet Metal" (Cleaning-Pickling-Neutralizing) by

B. T. Sweely, Chicago Vitreous Enamel Product Co. The next subject "Nickel Dipping" was covered in a paper by G. H. McIntyre of Ferro Enamel Corp.

## Enamel preparation and application covered

The Forum meeting for November 29 was under the chairmanship of C. P. Scripture of Ingram-Richardson Mfg. Co. of Indiana. The first paper for the morning session was "Preparation of Enamels" (Milling-Milling Additions) by Dr. G. H. Spencer-Strong of Pemco Corp. The next paper was "Reclaiming Enamels" by H. L. Cook of O. Hommel Co. This paper was read by William D. Caldwell of O. Hommel and discussion was led by Mr. Cook. Mr. Cook was also chairman of the afternoon session, which included a lengthy paper on "Application of Enamels" (Dipping-Spraying) by J. E. Hansen of Ferro Enamel Corp.

The Friday morning session was headed by E. H. Shands of the George D. Roper Corp. and featured a paper "Drying and Firing" by Dr. A. I. Andrews of the University of Illinois.

F. E. Hodek, Jr., Chairman of the Porcelain Enamel Institute Forum

Committee, headed the afternoon session on Friday. The program included "Electrostatic Spraying" by L. G. Goldberg of Harper J. Ransburg Co.; "Color Standardization and Problems Involved in Matching Paints and Porcelain Enamel" by Dr. Norman F. Barnes, General Electric Co.; and "Spraying vs. Dipping Ground Coat" by Paul E. Gerdes, A. J. Lindemann & Hoverson Co.

## Chapple is featured speaker at banquet

Social highlight of the Forum was the banquet and entertainment on Thursday evening. Featured speaker at the banquet was Bennett Chapple, American Rolling Mill Company, who is always well received among enamellers as a result of his keen insight into the problems of the industry and his imagination and enthusiasm in approaching future possibilities for porcelain enamel as a finish.

Many who have been in regular attendance at Forum meetings sponsored by the Porcelain Enamel Institute feel that they are probably the most valuable single contribution of the organization to the general improvement of plant practices and product quality. It presents the one

*This photograph shows the enamellers who attended the 7th Annual PEI Forum at Ohio State University, Columbus, Ohio, standing on the steps of Campbell Hall. It was in the auditorium of this building that the Forum meetings were held.*



opportunity during the year for technical men and practical shop operators to get together for an interchange of ideas on equipment, processes and tests, and it seems hardly possible that those attending the meeting can return to their respective

plants without carrying back information of sufficient value to warrant the expenditure and time required for attendance.

With the exception of two or three papers this year's meeting represented a review, and it is expected that

future Forums will be the source of much new and valuable information on enamel plant procedure.

Following are authors' resumés of the papers presented at the Forum which were available to the Editor when *finish* went to press.

## Preparation of sheet metal for porcelain enameling

By B. T. SWEELY

The preparation of metal for enameling purposes must be given the most serious consideration if economical manufacture is to be realized and high quality ware produced.

The selection of suitable drawing compounds or die lubricants compatible with the cleaning processes is a must in all cases. Special emphasis must be put on the die lubricant since its complete removal under any and all circumstances must be attained before proceeding further in the enameling operations. Reference is made to a paper given by G. W. Dykstra in 1939 on this subject and republished in the April, 1945 issue of *Better Enameling*.

Selection of the cleaner must be based on its ability to prove itself suitable to the plant conditions under which it is used. Recommendations of the supplier for the use of his cleaner must be kept in mind at all times and adequate control of the cleaning baths in maintaining their strength and working properties is essential to successful operation.

Too much emphasis cannot be placed on the proper rinsing after cleaning and at least two rinse tanks are recommended, one to be operated



"... high quality ware produced."

and changed not more than daily, the second one to be at room or tap water temperature with a constant inflow of fresh water.

It was pointed out that ware when

stored in such a manner that the cleaning compound be kept in a moist condition, reaction products between the cleaner and the iron may make cleaning difficult. As a corollary where lubricating compounds are allowed to oxidize and dry as well as accumulate shop dust when stored for long periods, difficulty may also be encountered. The suggested remedy is cleaning immediately after fabrication before assembling the parts bearing die lubricants into welded structures or placing them in storage waiting for enameling. It was also recommended that cleaning baths be changed at some interval within which it is proven may do a satisfactory job. An arbitrary criterion can be established in any shop by the number of square feet or number of units passed through the bath in a given time.

After cleaning and rinsing, pickling in sulphuric acid 6% concentration at 150 to 160°F. for 10 to 15 minutes was accepted as satisfactory in most enameling shops.

## Nickel dipping

By DR. G. H. MCINTYRE

First and foremost for successful operation of a nickel bath, it is absolutely essential to maintain constant and accurate control of the nickel operation throughout all its variables. For good enameling practice, it should be the aim of every shop operator constantly to control all operations throughout the shop. For successful nickel application, control is a *must*. I believe that all difficulties encountered in utilizing nickel flash and any doubt as to the efficacies gained are because of a lack of appre-

ciation of the importance of uniform conditions of the solution and treatment at *all* times. Many operators claim that adequate control is provided in their shop but too often a close check of the procedures actually reveal a sad lack of good control.

Most authors, researchers and shop operators agree that temperature of the bath, concentration of nickel salts, and degree of acidity or pH of the solution are of prime importance and must be controlled within rather narrow limits. In addition, such factors

as time of immersion, sequence, and methods of rinsing before and after the nickel flash, interval of exposure to air between each step in the process, thickness of nickel coating, type of steel surface being treated and proper removal of sludge, all have important bearings on the quality of the resultant coating. These various factors have been considered in more or less detail in the literature but are stressed in this discussion.

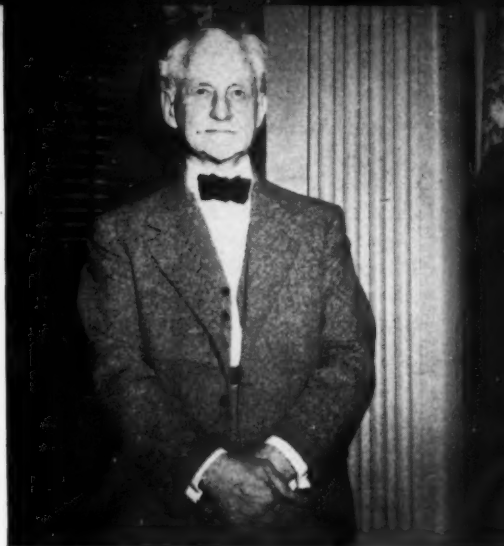
Large scale production procedures

to Page 40 →



*Left: Jack Trees of Apex Electrical Mfg. and Dick Schnell of American Central Mfg.*

*Right: Ross Purdy, A.C.S. secretary, was a guest at the Forum banquet.*



*Lower left: Herman Saure and Kenneth Lutz of Seeger-Sunbeam.*



## SNAPSHOTS AT THE



*Upper left: Clark Hutchison, Ing-Rich of Indiana, and C. A. McCafferty of Tappan Stove.*

*Upper right: Dwight Bennett, U. of I.; E. E. Marbaker, O. Hommel; and Robert C. Boyd of American Radiator & Standard Sanitary.*



*Left: James Readle and L. M. Burgdoerfer of Porcelain Steel Corp.*

*Right: Connie Given of Great Lakes Steel and George Wiese, Florence Stove.*





*Left: Ben Chapple of Armco and Frank Hodek of General Porcelain and Forum chairman.*



*Right: Bjorn Lund and Thomas Lucas of Allis-Chalmers Mfg.*

*Lower right: Paul Huppert of Lisk Mfg. and Jack Hiff of Harshaw Chemical.*

## E INSTITUTE FORUM

finishfotos



*Upper left: F. A. Petersen, U. of I., with Jean Vollrath and Paul Rohling of Vollrath.*



*Upper right: Ralph Schnoder, W. H. Ellis and G. A. Daum of Philco.*



*Left: George Guerrini and E. C. Seabright of Electromaster, Inc.*



*Right: D. D. Burnside of Consolidated Vultee and Jim Theodore of Jones Metal Products.*

## Forum papers

→ from Page 37

as well as research has shown the following conditions and sequence of operation to give effectively nicked steel without the attendant dangers of iron salts: —

1. After the acid pickle — five minute rinse in sulphuric acid of pH 3 at room temperature.
2. Nickel Dip — time is variable to suit plant conditions. Solution should contain  $\frac{3}{4}$  to  $1\frac{1}{2}$  oz., preferably 1 oz. single nickel salts per gallon. Maintain acidity at pH with addition of sulphuric acid or sodium hydroxide. Do not use boric acid as a buffer as this promotes excessive formation of complex iron salts. Ammonia and ammonium carbonate additions should be avoided for the same



finishfoto

“...carbonates should be avoided...”

reasons. Temperature of the bath should be 155° F.

3. Do not use a rinse, but if it is felt absolutely necessary, a short rinse

in sulphuric acid of pH 3.0 is effective. The time interval between the nickel flash and the rinse as well as between the rinse and the neutralizer should be extremely short.

4. Two neutralizer tanks should be available, the first made up in fairly strong solution and the second weaker. Suggested conditions are:
  - a. 0.4 oz./gal. sodium cyanide  
0.2 oz./gal. sodium hydroxide  
Temperature 140° F., time  $1\frac{1}{2}$  min. immersion
  - b. 0.12 oz./gal. sodium cyanide  
0.10 oz./gal. sodium hydroxide  
Temperature 140° F., time  $2\frac{1}{2}$  min. immersion

Carbonates should be avoided in the neutralizer since these have been found to hinder the cyanide removal of the ferrous salts.

## Reclaiming enamels

By HERMAN L. COOK AND WILLIAM D. CALDWELL

The first step in the successful reclaiming of porcelain enamels is the proper care of the residue deposited in the spray booths during the spraying operation. Plant refuse, grease and dirt from conveyors, and all other

1% opacifier, and milling an hour or two. Then the slip is screened and magnetically separated.

Another method is to blunge the reclaim in a suitable blunger, screen and run over a magnetic separator. This slip is then put in a mill by itself or added to a mill of porcelain enamel which has finished grinding, and then run for an extra hour or two.

A preferred method of treating blunged reclaim is to put it in a container, adding extra water, then enough sodium pyrophosphate to destroy all set, and allowing the slip to settle. The dirty water is then syphoned or drawn off, the dirt film on top scraped off and discarded, and since the residue is largely glass particles, it is usually milled with standard mill additions.

Iron particles are always found in reclaim, so special attention should be given to magnetic separation. If a rectifier is used as a source of direct current, meters should be used periodically to be certain voltage and amperage are not running too low for efficient magnetic separation.

Reclaim is usually mixed with good enamel in a proportion that will keep the reclaim used up. Since reclaim

is rarely as clean as milled frit, it is advisable to use it up on parts which have a lower standard of inspection.

It is obvious that any reclaiming program will give better results if the spray residue is kept clean. Many



finishfoto

Mr. Cook leads the discussion.

such contamination should be avoided. Reclaim should be picked up frequently and kept in suitable covered containers.

Porcelain enamels can be reclaimed by overloading a ball mill with spray residue, adding 1% clay and



finishfoto

Mr. Caldwell presents the paper.

plants use pressure rooms where porcelain enamels are sprayed. The ware is kept clean, and the reclaim is also kept clean. Scrap and reoperations will be reduced, less work done on reclaiming enamels, with the subsequent saving being appreciable.

## Applying wet process enamel by dipping and spraying

By J. E. HANSEN

The technique of dipping and draining as well as tong dipping of sheet iron ground coat is reviewed and discussed, together with the effect of fineness of grinding, water content and other local variables. It is pointed out that 'apparent dipping

weight', as determined on a control test plate, is not necessarily the amount of enamel on the ware as dipped in commercial practice. Care and conditioning of enamel in the dipping tank and use of water cooled and circulating tanks is reviewed.

Spraying methods and recommended practice is likewise reviewed, with special reference to cover coat enamels and black edging practice.

Control methods for application processes are reviewed in detail in this paper on dipping and spraying.

## Drying and firing

By A. I. ANDREWS

Following a discussion of the fundamental principles involved in drying, the influence of such factors as temperature, circulation and humidity was described. The use of radiant heat and convection were compared and the room type and continuous dryer discussed. Suggestions were made with regard to drying.

Under the subject of firing, the paper covered the fundamental principles, the equipment, the control, and the operation. The conditions to be controlled were listed, as the firing temperature and time, the proper support of the ware, uniform heating and cooling of the ware, and an atmosphere free from dust and sulphur and

water vapors. Each one of these topics was discussed in detail, fuels were compared, and the testing and checking pyrometers were described.

Following the paper, moving pictures of the development of drying and firing defects were shown. These included boiling, copperheading, tearing, re-boiling, and fishscaling.

## The application of electrostatic spraying

By L. G. GOLDBERG

In adapting electrostatic spraying to porcelain enamel on steel, it is felt that the following desirable features have been attained.

1. Continuous operation with minimum handling.
2. Improvement in efficiency by reduction of stack loss and reclaim.
3. Elimination of orange peel.
4. Uniform application.

The principles of electrostatic precipitation may be briefly summarized as follows:

A voltage source imparts a high static charge to an electrode system consisting of one or more rigid frames and fine wire elements and so positioned as to be adjacent to the conveyor. These wires become ionizing agents and establish a field between the electrode and the surface being coated. The guns are positioned so as to discharge the atomized material between the electrode and the piece to be sprayed. These particles enter the field and become ionized to the same polarity as the electrodes. The field of force between the electrode and the surface to be

coated is simultaneously established. Under the action of this field the particles are attracted toward and deposited upon the surface to be coated.

The fundamentals covering the use of electrostatic spraying were covered in detail in the January 1945 issue of *finish* by Richard E. Helmut, engineer, Harper J. Ransburg Company.

The results of extensive laboratory studies were described in a 3-part article in *finish* for June, July and August, 1945, by James B. Willis, Pemco Corporation.

Mr. Goldberg reports on some of the earliest production plant results in the porcelain enameling industry.

After promising results had been obtained both in the laboratory and on a pilot line the equipment was installed in production and the following factors were established:

1. Successful operation is dependent upon close control, adherence to established and proved practice and observation of its limitations.
2. Flat surfaces or uniform surfaces which can be rotated offer no difficulty.

3. A conventional enamel with mill additions to give high set at low specific gravity.
4. A fineness of 1% on 200 mesh and a specific gravity of about 1.70.
5. Low fluid and atomizing pressures.
6. A fully automatic gun using a fluid tip and air-cap that will give desired fluid flow and good atomization.
7. Reciprocating guns spraying from both ends of the field and so positioned that an angle of  $5^{\circ}$  -  $10^{\circ}$  is maintained with the surface.
8. Minimum exhaust.

The electrostatic spraying method has as its major advantage the highly efficient application of coating material in a fully automatic manner. The application to porcelain enamel affords sizeable savings in material and labor. In addition to these features the method often makes it possible to automatically spray items which high pressure automatic spray cannot normally handle.

forum resumés to Page 70 ➤



**PEMCO**—Karl Turk, Sr., president, Pemco Corporation, describes to a Finish reporter extensive expansion plans. They call for a 50% increase in plant area with added production facilities for frit, colors and other company products. Mr. Turk says the changes are being made to meet increasing industry demands for materials.

finishfoto



**MULLINS**—The first postwar Youngstown Kitchen units to come off the production lines at Mullins Manufacturing Corporation's plant at Warren, Ohio, are being inspected after being put on display. Left to right are Frank Knecht, sales manager, Charles A. Morrow, vice president in charge of sales, and C. D. Alderman, assistant sales manager. The cabinet sink shown is the largest of Youngstown's standard models.

## Examples of production



finishfoto

**PORCELAIN METAL PRODUCTS**—Here we see some of the first pieces to be porcelain enameled in the plant of Porcelain Metal Products Company of Pittsburgh since the company began a rehabilitation and expansion program in its enameling plant. A new pickling room, new driers and other new equipment are included in the company's modern plant at Carnegie, Pa.

**T**HE big push for production of porcelain enameled products has been delayed to some extent by a number of factors varying in their related importance with different plants and geographical location. In some instances it is labor; in others, materials. Price ceilings are said to be an important factor, and changing tax laws are reported to have kept many important items of merchandise off the market to date.



**APEX** — When Apex Electrical Manufacturing Company's washing machine assembly line began operation recently, C. G. Frantz (right above), president, was on hand to congratulate plant manager R. R. Todd for an outstanding job of speedy reconversion of the Cleveland plant. Mr. Frantz announced that the company expects to reach a daily production rate of 1500 washers during the first quarter of 1946.



**CONLON** — "Get 'em rolling!" has been the slogan at Conlon Corporation, Chicago. Here we see the company's new assembly line with the first washers in production since reconversion from manufacturing for war. These are dealer samples being routed to franchise holders throughout the country.

## and plant expansion

Irrespective of any delays, many companies are now manufacturing new products in worth while quantities. As for the porcelain enameling industry as a whole, expansion and modernization continues at as rapid a rate as possible under present conditions of material and labor supply.

Represented here are a few typical examples which, added to those presented earlier, illustrate current production and expansion.



finishfoto

**O. HOMMEL** — Here we see the first structural members being installed in a new addition to O. Hommel Company's plant in Pittsburgh. Facilities are being expanded for the manufacture of porcelain enamel frit and allied products produced by the company. According to Ernest Hommel, president, this new unit forms one important step in the company's expansion program.

# Coming Fast...



Porcelain enamel is the ideal surface finish for home appliances and equipment. It is hard and smooth, easy to clean, and is known as the "lifetime finish." It is especially important for such products as ranges, refrigerators, sinks, kitchen cabinets, breakfast sets, table tops, wall tile and panels, cooking utensils, work counter tops, washing machines, dishwashers, frozen food cabinets—in fact, wherever beauty, durability and ease of cleaning are important.

*The All Porcelain Enamel*

KITCHEN

*Yes, the ALL-PORCELAIN ENAMEL KITCHEN is coming fast and for some mighty important reasons:*

First of all, during the years of war shortages housewives have had occasion to really appreciate the many advantages of porcelain enamel.

Second, under the financing plans for new home construction and modernization, major appliances can now be included with construction work in the same long term mortgage. To protect this further investment over the longer mortgage period, banks and other financing organizations will certainly insist that the appliances so financed be as durable as possible. And it is almost a foregone con-

clusion that these financiers are going to prefer that porcelain enamel—the lifetime finish—be used wherever possible.

Third, the current advertising program of the Porcelain Enamel Institute is constantly reminding home makers and dealers of the many advantages of porcelain enamel.

For these and other good reasons, many appliance manufacturers are now planning to make even *wider* use of porcelain enamel.

If you are a manufacturer of consumer goods in which durability, color, attractive finish, sanitation, ease of cleaning, and protection from burns and stains are important considerations in the sale of your product, you should get the full story of porcelain enamel.

*If you will write to the address below we will send you complete design, fabrication and sales data to help you make most effective use of porcelain enamel no matter what your product may be.*



**PORCELAIN ENAMEL INSTITUTE**

1010 VERMONT AVE., N. W.

Washington, D. C.



Above: Douglas Whitlock Speaks as H. S. Minster observes.



Above: John J. Rouse the keynote speaker and Henry Morse president elect.

Right: Robertshaw's Frank Post & Bob Hurt of Hardwick Stove.



Below: V. S. Callaghan & C. J. Rogers of Crown Stove listen attentively.



Left: Marshall Stove Company's purchasing agent, E. O. Nelson.

Below: R. S. Gonthwaite, Ruten Electric, examines Rotap machine.



#### finishfotos from stove meeting

Above: F. H. Guthrie speaks. Lower left: Hering & Miller of Carnegie-Illinois Steel; Whittier of Cooper Oven Thermometer and Mackasek of PEI. Lower right: Davis of United Stove, Clausen of Alden's, with Johnson & Armel of "Nubian."



# Thirteenth annual meeting

## of cooking and heating appliance manufacturers

THE Institute of Cooking and Heating Appliance Manufacturers held its 13th Annual Convention and Exhibit at the Netherland Plaza Hotel, Cincinnati, Ohio, on December 3, 4 and 5. The registration list showed a total attendance of 390 as of 3 P.M., December 4. The total attendance was reported to be considerably in excess of this. Manufacturers and suppliers from all parts of the country were present.

### Porcelain enamel represented in exhibits

Not only was the attendance the largest of any of the Institute meetings, but the number of exhibitors was appreciably increased. There were three exhibits representing the porcelain enameling industry — The Porcelain Enamel Institute, Ferro Enamel Corporation and the O. Hommel Company.

The first day, Monday, was taken up with registration, a meeting of the Board of Trustees with Henry Morse presiding, and other small meetings of various committees within the organization.

### Minster is convention chairman

The General Session got under way on Tuesday morning with Henry S. Minster acting as convention chairman.

The keynote address, "A Business Appraisal for 1945," was presented by John J. Rowe, president, Fifth-Third Union Trust Company, Cincinnati, Ohio.

"A Challenge to the Appliance and Construction Industries," was the title of an address by Douglas Whitlock of Sanders, Gravelle, Whitlock & Howrey; chairman, Advisory Board, The Producers' Council, Washington, D.C.

"The construction industry should adopt a comprehensive research program and form strong local organizations for the purpose of reducing the cost of building," Mr. Whitlock said — then he continued:

"The industry faces a few years of record breaking volume as a result of wartime restrictions on civilian building, but if we are to maintain construction activity and employment on a high level after the large backlog of demand has been met, we must effect economies which will lower the cost of building and place construction within the reach of thousands of additional buyers," he continued.

### New ICHAM Officers

President: Henry Morse, Florence Stove Co., Gardner, Mass.

Vice Presidents: Alden Chester, Globe American Corporation, Kokomo, Indiana.

M. F. Cotes, Duo Therm Division, Motor Wheel Corp., Lansing, Michigan.

Foskett Brown, Gray & Dudley Company, Nashville, Tenn.

Sheldon Coleman, Coleman Company, Inc., Wichita, Kan.

Secretary-Treasurer: Neil Cargile, Allen Mfg. Company, Nashville, Tenn.

"If we are to make any appreciable reduction in the cost of building homes and roads and schools and stores and factories, there is a need for the highest type of cooperative action within the industry. We can and must take full advantage of the savings offered by dimensional coordination, by modernization of building codes, and by greater use of the various labor-saving techniques which already have been perfected in field construction. We have scarcely started to crash in on these examples of progress.

"In addition, we have barely begun to exhaust the possibilities of research as a tool for cost reduction. The fact is that no overall research program for this industry has even been laid out. To my mind, that is our greatest single need, and it is to be hoped that the industry will inaugurate an exhaustive research program without

delay, as the surest means of reducing costs and thereby assuring an era of sustained high-volume building and employment.

"Even a 10 per cent reduction in building costs would make a world of difference in the future of this industry. A 20 per cent reduction would bring new homes within the reach of millions of additional families. There is no time to lose. The five or six years of large-scale building which lie before us will pass all too quickly. We must be ready to meet new and increasing needs as they arise.

"The necessary financing for an adequate research program can be found, once a down-to-earth program has been laid out. We know that we need to study the use of materials in combination, the pre-assembly of products on and off the site, and methods of reducing manufacturing costs. But there are other opportunities for cutting costs, and we must find them out as fast as we can."

Sheldon Coleman, executive vice president, The Coleman Company, Inc., Wichita, Kansas, gave a talk that was well received entitled "Trends in Merchandising."

The business covered in the meeting included a report by the president, announcement of election results, and the secretary's report on the business affairs of the Institute.

### Labor relations and purchasing policies discussed

The General Session for Tuesday Afternoon had Henry H. Morse as presiding officer. The first speaker was Merlyn S. Pitzele, Labor and Management editor, "Business Week," New York, N.Y., who gave a lengthy discussion of "Labor Relations and the Conditions for Industrial Peace."

Some pertinent facts concerning negotiation of labor contracts was covered by George A. Seyler, assistant commissioner, National Metal Trades Association, Chicago, Illinois, in his

to Page 74 →



Left: A. W. Gudge, Binks Manufacturing Co.—“In some cases automatic spraying is the only method . . .”

## THREE SPEAKERS AT THE DECEMBER CHICAGO CLUB MEETING



Above: L. W. Lammiman, The DeVilbiss Co.—“ . . . reclamation of over-spray has taken on a new and important significance.”

Right: E. P. Miller, Harper J. Ransburg Co.—“ . . . low atomizing pressures and low exhaust velocities are needed . . .”

Information on electrostatic spraying results similar to that presented by Mr. Miller appears in the P.E.I. Forum report on page 41.



finishfotos

## AMONG THE LISTENERS



Harry Sirovy, Century Vit, lunches with Harold Gray of Vitreous Steel Products Co.

Levant Huyck, of Huyck Construction, talks it over with Roy Troutman of Chicago Vitreous.

# Chicago enamellers December meeting

**E**NAMELERS in Illinois and surrounding states continue to show an increasing interest in the activities of the Chicago District Enamellers Club as evidenced by a turnout of 115 at the last meeting, which was held on December 8 at the La Salle Hotel in Chicago.

## Automatic spraying covered

Automatic mechanical spraying and automatic electrostatic spraying were the topics covered by the three featured speakers for the December meeting. A. W. Gudge, Binks Manufacturing Company, presented a paper "Automatic Spraying in the Enameling Industry." E. P. Miller, Harper J. Ransburg Company, covered the results of tests in a production porcelain enameling plant with the electrostatic process in his extemporaneous talk "Electrostatic Spraying as Applied to the Field of Porcelain Enamel." L. W. Lammiman, The DeVilbiss Company, amplified the information on automatic spraying by mechanical means in his paper "Application of Automatic Spraying in the Porcelain Enamel Industry."

A lively discussion followed the speakers' presentations. Such questions as "Should the automatic spray precede or follow the manual operator spraying flanges?"—"How does hydraulic motivation compare with motor drive?"—"How do cable conveyors compare with pin type conveyors?"—"Should stationary guns operate constantly?"—"What production may be expected from the mechanically operated spray, and from the electrostatic system?"—and others—were asked by porcelain enamellers present. Those entering into the discussion at the meeting included Hall of Globe American; Donaldson of Roper; Pouilly and Rozeno of American Stove; Lander, Cribben & Sexton; Duvall and Meacham of Chicago Vitreous; Plankenhorn and Petersen, U. of I.; etc.

## Business meeting

During the brief business meeting, the appointment of an additional

delegate—Roger Fellows, Chicago Vitreous Enamel Product Co.—and alternate—Arthur Lander, Cribben & Sexton Co.—were made to represent the Club in the Chicago Technical Societies Council.

As a result of additional memberships obtained by the membership

committee, the secretary-treasurer reported a current total paid membership of 140.

## Date set for next meeting

The tentative date of February 23, selected earlier as a probable meeting date, was established as the definite date for the next get-together.

## Automatic spraying in the enameling industry

By A. W. GUDGE

In some cases automatic spraying is the only method by which a satisfactory finish can be obtained; however, there are also many cases in which automatic equipment is not desirable from any viewpoint.

An automatic spray system consists of a number of balanced component parts, synchronized to work together and produce a definite predetermined result.

There are three main types of conveyors used in automatic spraying—flat type, overhead and spindle or floor mounted.

Sheets or panels may be sprayed on either the flat type conveyor or the overhead conveyor. Vertical edges have to be sprayed manually in auxiliary booths.

A spindle type machine is most desirable from a spraying standpoint for cylindrical shaped work, but there

are several serious drawbacks due to the abrasive action of the off spray.

One of the most important items of an automatic machine is the work holder. It must hold the work in the correct spraying position and must not mask the finished surfaces. It must be sturdy enough to withstand cleaning without being distorted.

The exterior may be sprayed by guns in fixed position, or by guns mounted on a carriage that is picked up by the chain and follows the work.

The interior is sprayed by a gun with an extended nozzle inverted into the work which sprays on the withdrawal stroke.

Each object has to be analyzed and the correct spraying method arranged as no hard and fast rules apply to automatic finishing. Each machine is custom built to fulfill specific conditions.

## Application of automatic spraying in the porcelain enameling industry

By L. W. LAMMIMAN

Out of the vast multitude of automatic spraying machines made during the war, for doing the heretofore considered impossible, have come several types of machines which combine all the worthwhile proven features into a few well-developed and standardized machines for postwar production. Those with the widest acceptance are (1) Rotary Turntable Type, (2) Chain Conveyor Type, (3) Cylinder Coating Type, (4) Transverse Moving Gun Type. These four types with their manifold variations have sufficient flexibility to handle practically

all coating problems that come within their range of adaptability.

The fourth is the one of greatest interest to those with flat ware enameling production problems.

While originally designed to coat wall board and leather, necessary modifications were made to meet the requirements of the porcelain enamel industry. It has filled an economical need in that industry in the past and is practically a "must" if the production demand of the present and the future is to be met.

to Page 62, Col. 2 →

## Eastern enamellers second postwar meeting

ONE of the best attended meetings in the history of the Eastern Enamellers Club was held on Saturday, December 15, at the Ritz Carlton Hotel in Philadelphia. Eighty-five of the members were present. Under the guidance of President Nate Klein, the affair moved smoothly from the beginning of the luncheon, which preceded the business meeting, until the meeting was adjourned.

### The Program

Interpreting both the humorous and the serious side of porcelain enameling and its possibilities, both speakers — Harrie Parker of Glenwood Range Company, Taunton, Mass., and Carl G. Strandlund of Chicago Vitreous Enamel Product Company, Cicero, Illinois — handled their subjects to the entire satisfaction of their audience.

**Mr. Parker**, in his talk on "Automatic Enameling" burlesqued the enameling plant and procedure of the future in a way that kept the crowd in rare good humor. His suggestion for a "conveyor system" really was a

gem — a la Goldberg. But being serious for a moment, at the end of his talk, Mr. Parker said that it was a



Carl Strandlund

*"not enough labor. A million homes a year is the required minimum."*

fact that every "silly" thing that he had mentioned had as its basis an actual discussion or suggestion proposed to him by consulting engineers.

**Mr. Strandlund**, in his talk "An Engineer Looks at Porcelain Enamel," stressed the potentials of porcelain enamel in home construction, particularly the prefabricated home. He quoted statistics which indicated a tremendous and logical market in this field. One interesting point which he made was to the effect, that even though materials became available for home construction in the usual sense, there was available a labor market that could only produce approximately 400,000 homes a year when a million was the absolute minimum required. Prefabricated homes can, of course, top this figure.

It has been decided that the next meeting will be held about the fifteenth of March. No definite decision was reached as to the city in which it will be held nor the type of speakers. This was left for a decision of the program committee.

The Eastern Enamellers appear to be well on the road to building a strong club, valuable to all eastern enamellers, and with representative membership.

*This finishfoto was taken at the first postwar meeting of the Eastern Enamellers Club held at the Ritz Carlton Hotel in Philadelphia on Saturday, September 22, 1945.*



# NEWS

W. A. Buford, Porcelain Enamel Company, announces the addition of Charles H. Seeger to the organization. Mr. Seeger (left) to Mr. Buford.

## Stearn has porcelain control at Kelvinator

Mr. W. Stearn joined the Nash-Kelvinator Corporation organization at Grand Rapids, Michigan, effective November 1st, and has been assigned as supervisor of the porcelain control, reporting to Mr. J. Schuck who is the porcelain superintendent, according to a report from W. R. (Wade) Willey, assistant works manager.

## Jaeger to represent Ferro and Lawson

According to a recent announcement Roy H. Jaeger is now district manager in the St. Louis district for W. B. Lawson, Inc., Cleveland chemical supply house; and St. Louis sales representative for Ferro Drier & Chemical Co., whose line includes metallic soaps, driers for paint and varnish, printing inks, etc. Mr. Jaeger, who is well known to the enamellers in the St. Louis area, will have his office at 1214 Arcade Bldg.

## Two Norge strikebound plants reopen

Prospects for a near-future return to "normal" operating conditions in the two Muskegon area plants of the Norge division of Borg-Warner Corp., "appear bright," Howard E. Blood, Norge president, declared following termination of strikes at the two factories.

Present plans of the company call for production of all refrigerator compressor units in the Muskegon plant, strikebound since July 24, and for output of refrigerator cabinets

in the Muskegon Heights plant which has been shut down since September 8.

Commenting on conclusion of an agreement with the two American Federation of Labor, United Automobile Workers units, Blood said, "This, and the subsequent return of our employees is the most welcome news for us since 'V-J Day.' We are making every possible effort to push reconversion and production so that refrigerators will be rolling from our lines in the very near future."

## Seeger-Sunbeam announces \$4,950,000 expansion program

The Seeger-Sunbeam Corporation, at the annual meeting in St. Paul, Minnesota, November 27, 1945, declared their regular quarterly dividend of 20¢ per share, payable December 27 to shareholders of record December 10, according to Walter G. Seeger, president.

Directors elected by the stockholders included, besides Mr. Seeger: John S. Holl, N. H. Griebenow, E. P. Brooks, E. Gudeman, A. J. Lowell, J. H. Dennedy, J. J. Leonard, and J. W. Seeger.

The Board of Directors then elected the following officers of the Corporation: Walter G. Seeger, president; John S. Holl, vice president and general manager, St. Paul; A. J. Lowell, vice president and general manager, Evansville; N. H. Griebenow, vice president and works manager; J. J. Leonard, vice president and sales manager; C. A. Muessel, vice president and manager of Eastern Sales; C. W. Moberg, secretary and treasurer; John W. Seeger, assistant secre-

tary and assistant treasurer; Walter A. Holt, assistant secretary and assistant treasurer; and R. M. Reay, manager of commercial sales.

Mr. Seeger announced that the expansion program of \$4,950,000 which will include both building and equipment for the factories at St. Paul, Minnesota, and Evansville, Indiana, are progressing most satisfactorily.

New and larger Pacific Coast Region offices of Detrex Corporation have been established at 112 West Ninth Street, Los Angeles 15, California, according to a report from the company's Detroit office.

## TAM personnel announcements

Dr. Stephen F. Urban, 91½ years with Carnegie-Illinois Steel Company Research Laboratories in South Chicago, has been made director of research in charge of all divisions of the Research Laboratories. These include Metallurgical, Ceramic and Chemical.

Dr. Eugene Wainer, formerly in charge of the Chemical and Ceramic Divisions of the Research Laboratories, has been made Associate Director of Research with authority in all three divisions.

Mr. William Baldwin has been made Chief of Ceramic Division.

Klem Chemical Works has announced their removal on October 20 to a larger and more modern plant at 14401 Lanson Avenue, Dearborn, Michigan.

## Central District Enamellers Club announces program for January meeting

The Central District Enamellers Club will hold its first post-war meeting at the Hotel Hollenden in Cleveland on January 11. It is to be a dinner meeting, and is scheduled for 6:45 P.M. (Same as tentative date announced in December finish.)

According to Club officers, the program is planned to give the porcelain enameler up-to-the-minute information on business prospects for the

industry — a subject which will be covered by three speakers who are in a position to know and analyze current trends and market conditions.

The speakers and their subjects are:

L. S. Hamaker, Republic Steel Corporation — "An Appraisal of the Business Outlook."

F. C. Woelsgle, Carnegie-Illinois Steel Corporation — "Future Markets for Porcelain Enamel."

C. D. Clawson, Ferro Enamel Corporation — "How the Central District Enamellers Club Can Aid the Industry."

Norman H. Stolte of Enamel Products Company and Club president announces that committees will be appointed at the January meeting for promoting the Club's future activities, and that a second meeting will be held in March.

One appointment which has already been made is that of H. F. Bond, Ferro Enamel Corp., who will be in charge of programs and publicity.

#### **Punderson organizes cleaner company**

L. E. Punderson, who has for 17 years been active in the metal cleaning field, has, together with his son, L. A. Punderson, formed the L. E. Punderson & Son Company in Cleveland, Ohio. Offices are at 402 Swetland Bldg.

Before the war Mr. Punderson was a representative for J. B. Ford Company in the porcelain enameling field. His wartime job was — head of chemical division, W.P.B., 5th and 12th districts.

It is the intent of the new organization to serve the Porcelain Enameling industry exclusively with cleaners and drawing compounds.

#### **Instrument Society holds organization meeting**

Action taken at the organization meeting of the Instrument Society of America, held at the Hotel Roosevelt, Pittsburgh, on October 19 and 20, was made known following the conference by R. F. Roberts, chairman of the publicity committee. Mr. Roberts stated that 14 societies sent dele-

gates, alternates, members and guests to the event.

Albert F. Sperry, pro tem president, presided. Committee chairman M. H. White submitted a report on the constitution. Committee chairman Paul G. Exline reported that the 1946 Exhibit and Conference will be held in Pittsburgh September 16 to 20 inclusive.

#### **Croskey joins Locke Insulator**

R. G. Bellezza, president of the

Locke Insulator Corporation, has announced the appointment of Carl Croskey as process ceramic engineer for the Corporation.

Mr. Croskey received his B.Sc. in Ceramic Engineering at Ohio State University and later did post graduate work at Rutgers University. He has been associated with the Akron Porcelain Company, The Central Silica Company and later was an instructor in Ceramic Engineering at Virginia Polytechnic Institute.

#### **A.C.S. gives reception for Wells and Tefft**



*Arthur A. Wells, president of the Ohio Ceramic Industries Association; Ross C. Purdy, general secretary, A.C.S.; and C. Forrest Tefft, A.C.S. president.*

Arthur A. Wells, president of the Ohio Ceramic Industries Association and C. Forrest Tefft, president of the American Ceramic Society, were entertained at a reception at the American Ceramic Society's office recently. The staff of the Society received the

members of the Ceramic Association.

The occasion was the annual Meeting of the Ohio Ceramic Industries Association which was held at Ohio State University. About two hundred were in attendance at the meeting.

#### **DeVilbiss schedules four courses for industrial finishers in '46**

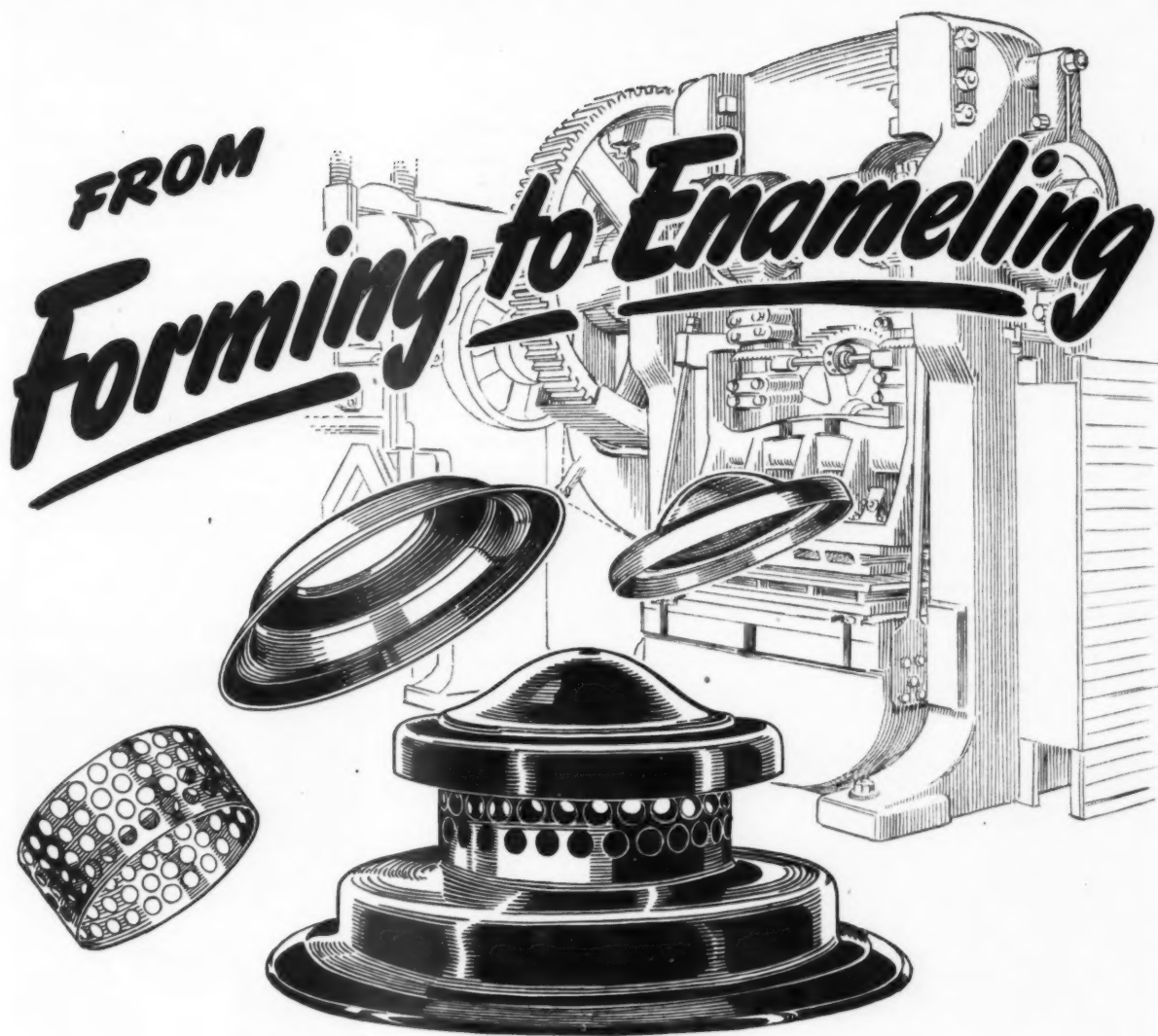
Four one-week courses in the first half of the 1946 School of Finishing conducted by The DeVilbiss Company, Toledo, Ohio, will be devoted to industrial finishers. Free to users of DeVilbiss Spray Equipment, these courses will be identical in classroom instruction and shop work. Scheduled starting dates are January 14, March 11, April 8 and June 10.

DeVilbiss urges industrial finishers interested to write for reservations at

least two weeks in advance of any session.

#### **Carnegie-Illinois to expand Gary sheet capacity**

A program for improvement of facilities for the manufacture of cold reduced sheets at the Gary Sheet and Tin Mills of Carnegie-Illinois Steel Corporation, Gary, Indiana, was announced recently by J. L. Perry, president of this U. S. Steel subsidiary. The new program supplements a pre-



Most of our customers say that they save money when they give us the complete job of forming and enameling their parts.

Lantern hoods are typical of the work we do. These are formed, welded into an assembly and enameled in our shop.

Press and welding equipment, together with skilled workers, are all geared for low cost, high quality production.

What can we make for you?

If you prefer, we will take parts formed in your shop and enamel them.

**VITREOUS STEEL PRODUCTS CO.**

BOX 1791, CLEVELAND 5, OHIO (Factory at Nappanee, Ind.)

vious project announced June 15, 1945 and, when completed, will increase the mill's annual capacity for cold rolled products by 232,600 tons.

The company says these improvements will enable Carnegie-Illinois to give better service to mid-western manufacturers who use cold reduced steel sheets for making refrigerators, household appliances, enamelware and similar sheet steel products.

The program includes increasing the capacity of the plant's 80-inch hot strip mill. A new 54-inch, four-stand cold reduction mill will be installed and improvements made on the present 84-inch, three-stand cold reduction mill. In connection with these improvements, an 18-year-old, 42-inch hot strip mill and ten thirty-five-year-old hand sheet mills will be dismantled, it was stated.

#### **New chief metallurgist at Deepfreeze**



Mr. H. W. Whitmore, chief engineer of the Deepfreeze Division, Motor Products Corporation, North Chicago, Illinois, announces the appointment of George W. Miller as chief metallurgist for Deepfreeze. A graduate of the University of Illinois in the Science of Metals, Mr. Miller combines an experience in foundry work and research.

Mr. Miller comes directly from Nash-Kelvinator Propellor Division in Lansing, Michigan, where he specialized in tooling problems during the war. Formerly he was instructor in Metallurgy and Foundry Work at

the Michigan State College, where he supervised research.

#### **Frigidaire announces complete line of kitchen cabinet equipment**

E. R. Godfrey, general manager of the Frigidaire Division, General Motors Corporation, Dayton, Ohio, announced the adoption of Frigidaire's Kitchen Modernization Program which will bring a complete line of kitchen cabinet equipment to the public. Following closely on the heels of the announcement that Frigidaire would manufacture and sell home freezers in various styles, the sale of kitchen cabinet equipment marks the second postwar expansion of the Frigidaire line of household and commercial electrical appliances.

The cabinet equipment will include base, wall and utility cabinets and sink units, all of various sizes. "Packaged" Centers — standard packages of various sizes for the refrigerator, range and sink centers — will constitute the majority of Frigidaire kitchen cabinet volume, but individual units and complete kitchens will also be marketed.

#### **Philco seven months orders 43% above total for 1941**

Orders totaling \$110,000,000 have been received from Philco distributors for the company's new 1946 refrigerators, freezers, air conditioners and radio receivers and radio-phonographs, it was announced by Thomas A. Kennally, vice president in charge of sales. Orders are now being taken for delivery only up to June 30, 1946. Mr. Kennally said, and distributors have been asked to limit themselves to the minimum quantities they require.

"The tremendous reception accorded our new products is reflected in the fact that orders for seven months only are 43% greater than our sales for the entire year 1941, when we did our all-time peak civilian business of \$77,073,636," Mr. Kennally said.

#### **Hotpoint tosses out "f.o.b."**

Edison General Electric Appliance Co. has announced a nation-wide

pricing policy by which all of its appliances would be delivered to consumers in Chicago, New York or San Francisco at a uniform price, instead of the formerly practiced f.o.b. factory policy. Previously the company had announced that its electric stoves and water heaters would sell at 1942 prices. (*Finish*, October 1945.)

The new policy covers refrigerators, home freezers, washing machines, ironers, dryers, dishwashers and metal cabinets, as well as ranges and water heaters, according to Ward R. Schafer, vice president. Schafer said the move was aimed at protecting the public against "unauthorized overcharges" that might result under the company's announced low price post war selling plan.

#### **Steele to direct Bendix purchases**



W. H. Steele has been named director of purchases for the Bendix Home Appliances Corporation, South Bend, Ind., it is announced by H. L. Spencer, vice president in charge of manufacturing.

For nearly 16 years Steele was with Caterpillar Tractor Company, Peoria, as buyer, assistant purchasing agent and purchasing agent. He was chosen for the Bendix position from a large national group of candidates after serving as purchasing agent for Caterpillar during the war years.

In 1946, Steele will direct the purchase of materials for Bendix home appliances with a retail market value of approximately \$100,000,000, Spencer said.

*More news Page 56 →*

*Announcing*

# KAYKOTE

**The new low temperature ceramic coating  
for protection against corrosion.**

Low temperature ceramic coatings produced under Kraus patents played an important part in the protection of many wartime products such as army field ranges, tent hoods, spark arrestors, aircraft heaters and other similar items where resistance to heat and corrosion was essential.

KAYKOTE represents a refinement of these wartime finishes for peacetime applications. This new coating is highly resistant to rust, corrosion, heat, impact, abrasion, scratch, acids and alkalis, and will withstand temperatures up to 1200° F.

KAYKOTE is produced exclusively by Kraus Research Laboratories and is covered by patents Nos. 2182086, 2261260, and 2309962, and applications S.N. 452605 and 460483.

*For additional information write to—*

**KRAUS RESEARCH LABORATORIES • Sparks, Maryland**

#### **Material handling society formed**

At a dinner meeting held in the Roosevelt Hotel in Pittsburgh on Monday, October 8th, a group of men interested in material handling voted enthusiastically to form a society.

A group of objectives was suggested for the Society which included: 1. To further the application of good material handling practices; 2. To encourage an interchange of ideas among the members; 3. To promote education and training in the science and practice of practical co-ordinated material handling; 4. To arrange for the collection and dissemination of information relating to all phases of material handling.

#### **McLaughlin returns to Chicago Vit**



finishfoto

Major John L. McLaughlin has returned from the wars in Europe to his old job as service engineer with the Chicago Vitreous Enamel Product Company, according to a recent report from the company. He had been in the Army five years.

#### **Frigidaire announces refrigerator pricing policy**

H. M. Kelley, appliance sales manager of Frigidaire, announced that Frigidaire has put into effect a National Pricing Plan which, exclusive of excise and local taxes, establishes a retail cash installed price for each model that is the same throughout the entire United States. Under this plan all carload freight charges from the factory to distributors and dealers,

and all less-than-carload freight charges from distributors to dealers outside warhouse-city metropolitan areas served by a common carrier, will be paid by the factory.

This plan replaces the zone price plan under which Frigidaire has been operating for a number of years past. Under the zone plan refrigerators were sold at different prices, depending on the zone the dealer was located in, and the distance the dealer was from the zone distribution point.

Mr. Kelley further stated that this National Pricing Plan seemed to be the most satisfactory solution to the Office of Price Administration requirement that a printed retail price label be attached to all refrigerators at the factory.

#### **Pettyjohn new director of Institute of Gas Technology**

Commander Elmer Shaw Pettyjohn, U.S.N.R., has been named director of the Institute of Gas Technology in Chicago, succeeding John I. Yellott, who has been appointed director of research of the BCR (Bituminous Coal Research) Locomotive Development Committee.

Commander Pettyjohn, who is absent from the country at present, will take up his new duties upon termination of his naval assignment.

#### **Smith named Westinghouse Electric Appliance Division P.A.**



Appointment of Edward L. Smith as purchasing agent of the Electric

Appliance Division, Westinghouse Electric Corp., Mansfield, Ohio, has been announced by Andrew H. Phelps.

Mr. Smith, who has been employed at Westinghouse since 1927, succeeds J. A. Schultz who was transferred to Mr. Phelps' staff at headquarters in Pittsburgh.

The new purchasing agent is a native of Mansfield and has worked in various posts at the Electric Appliance Division, and in 1937 was named assistant manager of quality control, the post he held prior to his new appointment.

#### **Alderman gets new Youngstown Kitchens post**



C. D. "Deck" Alderman has been named assistant manager of sales for the Youngstown Kitchens division of Mullins Manufacturing Corporation, Warren, Ohio, it has been announced by Charles A. Morrow, vice president in charge of sales. Mr. Alderman has been with Youngstown since 1938. During the war he served as a major attached to the U. S. Army Ordnance Department in Washington. His position is a new one in the Youngstown organization.

#### **Toledo gets Industrial and Commercial Gas Conference**

Harry A. Sutton, chairman of the Industrial and Commercial Gas Section, has announced that the 1946 American Gas Association Conference

to Page 60 →

# Rotospraying ...

is the STANDARD method of sieving  
PORCELAIN ENAMEL SLIP

**R**OTOSPRAYING has become the accepted term in the porcelain enameling industry to describe the efficient and economical sieving of porcelain enamel slip through the use of the patented ROTOSPRAY SIFTER. Hundreds of installations have been made throughout the industry since the first Rotospray was installed in a porcelain enameling plant in 1926. All of these Rotosprays have given eminently satisfactory service. The earliest machines installed are again in daily use doing a better and more economical job of screening than is possible by any other method.

Other hundreds of Rotospray Sifters are doing an equally important job in chemical plants, paper mills, potteries, etc.

Rotospray equipment is again being manufactured. Prompt deliveries are impossible under present conditions — but service is steadily improving. If you need equipment for a new plant, or additional Rotospray equipment to supplement Rotosprays already in use, we suggest you list your orders as soon as possible with one of our sales representatives.

Three sizes of Rotospray Sifters are available to meet varying capacity requirements. For detailed information write direct to Rotospray or to any one of our authorized agents.

*Sales representatives from coast to coast —*

B. F. DRACKENFELD & CO., INC.,  
New York, N.Y.

PEMCO CORPORATION, Baltimore, Md.

FERRO ENAMEL CORP., Cleveland, Ohio,  
and foreign offices.

CHICAGO VITREOUS ENAMEL PRODUCT CO.,  
Cicero, Ill.

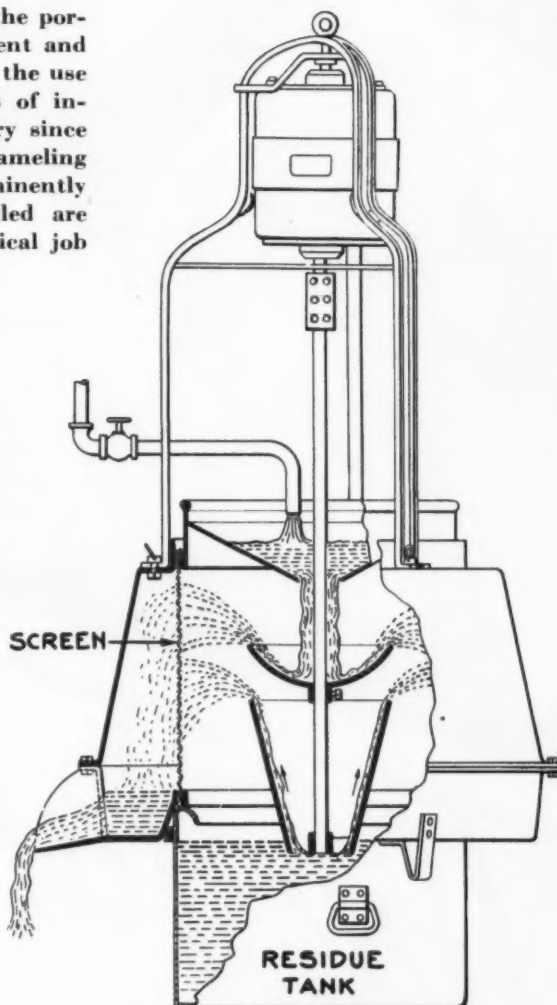
BRAUN CORPORATION, Los Angeles, Cal.

BRAUN KNECHT & HEIMANN CO.,  
San Francisco, Cal.

*Foreign Representatives —*

WATFORD ENGINEERING WORKS,  
Watford, England.

ELOF HANSSON, Gothenburg, Sweden.



*Registered Patents:*

U. S. Pat. No. 1769586  
U. S. Pat. No. 1769587  
Great Britain Pat. No. 289847  
German Pat. Ser. No. 71149-28  
French Pat. No. 650190

## ROTOSPRAY MANUFACTURING COMPANY

562 WASHINGTON BOULEVARD • CHICAGO 6, ILLINOIS • TEL. DEArborn 7196



# Basic

## The Famous "16"

Cancelled for Victory-Pemco's "16 Basic Colors" are again in production. Improved for modern enamels they're better than ever. Clear, sharp and fadeless they're unlike any other colors you have ever tried.

They definitely eliminate delays in production schedules.

# Colors Are Back Again

With these "Basic 16" more than 400 color combinations are possible. They simplify color matching, eliminate unbalanced inventories and cut production costs. Pemco "Basic 16" enable any plant to give service on any porcelain enamel color job.

Developed exclusively for use in porcelain enamel the "Basic 16" represent more than 35 years of experimentation and shop practice. Uniform in quality you get the same results day after day after day.

When used with Pemco Continuous Smelted Frits they add a "sales appeal" to your finish that just piles up profits.

Of course **YOU** intend to use them—Now!

**PEMCO CORPORATION**  
BALTIMORE - 24 • MARYLAND

→ from Page 56

on Industrial and Commercial Gas will be held in Toledo, Ohio, Thursday and Friday, March 28th and 29th, at the Commodore Perry Hotel.

A program of value to all industrial and commercial gas men and appliance and equipment manufacturers is being planned by the Program Committee under the chairmanship of Ralph S. Wenner. The object of this conference, through the subjects to be discussed and the personal contacts

which will be made, is to aid the industrial and commercial branches of the gas industry in the continuance of their efforts to have the service rendered by the gas industry used most extensively and efficiently during the reconversion and postwar periods.

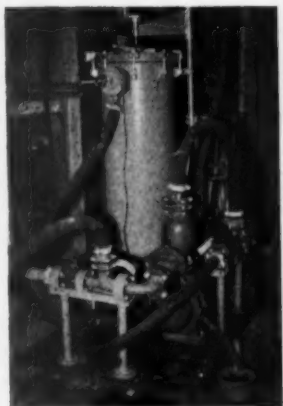
#### International Lighting Exposition to be held in Chicago

An international Lighting Exposition, sponsored by the National Elec-

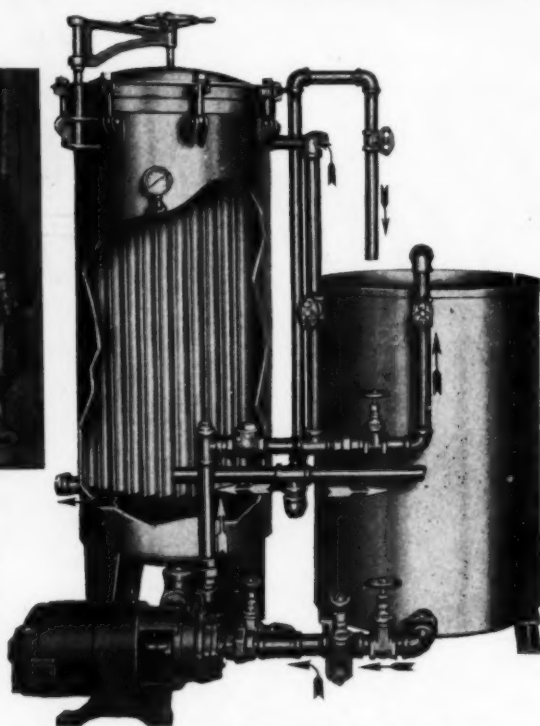
trical Manufacturers' Association, Industrial and Commercial Lighting Equipment Section, will be held at the Stevens Hotel, Chicago, April 25-30, 1946. Chairman of the Exposition is E. H. Huerkamp, manager of the Westinghouse Lighting Division, Cleveland.

Important and timely adjunct to the Exposition will be a series of Lighting Conferences scheduled to start on Friday morning, April 26, and continuing Saturday morning, April 27, Monday morning, April 29 and Tuesday morning, April 30. The Exposition will be open in the afternoon of these same days.

### KEEP PICKLE ROOM SOLUTIONS "ALIVE" LONGER WITH INDUSTRIAL PRESSURE FILTERS



Above: This installation in a large enameling plant pickle room recirculates and filters 2,000 gal. of nickel tank solution per hour, operating approximately 8 hours out of 24.



A stationary type Industrial Plate Filter available in sizes with from 95 to 290 sq. ft. of filter area.

Industrial Filters offer you a modern and dependable clarification and purifying system to keep your pickle room producing at top speed. Made in a wide range of sizes and capacities, both portable and stationary, they offer the convenient and labor saving method of filtering nickel or neutralizer solutions.

Save time, save money, and keep your new pickle room at top efficiency. Include Industrial pressure Filters in your plans for a modern plant. Send for specifications on a unit to meet your requirements.

Automatic Filter powder feeders, special alloy pumps, Filter cloth and Filter Aids

#### INDUSTRIAL FILTER & PUMP MFG. CO.

1621 WEST CARROLL AVENUE • CHICAGO 12, ILLINOIS



It is expected that the conferences will draw attendance from all sections of the United States. The conferences are designed, according to the Program Committee, to "bring to lighting men of the utilities, electrical wholesalers and contractors, architects and others, the technical discussions and demonstrations of lighting techniques which will put them abreast of the fast moving developments of this industry.

#### New Trends to be Discussed:

"Leading authorities will headline a series of discussions on the new trends in light sources, lighting equipment and light practices. Also included will be sessions devoted to 'Getting up to date on lighting practices,' 'Use of light and color to improve plant lighting,' 'New lighting ideas for stores, schools and offices,' and other allied subjects."

#### Sales Training Sessions:

"Another important section of the conference agenda will be the sessions devoted to the subject of sales training on

lighting, lighting service and lighting equipment selling."

**Printed Program Soon Available:** "In course of preparation is a printed folder containing the program, together with pertinent information concerning the conferences. Copies of the program will be available after January 15th and may be obtained by writing International Lighting Exposition, 111 W. Jackson Blvd., Chicago, Illinois."

**Thompson to head  
Ferro St. Louis office**



Ferro Enamel Corporation, Cleveland, Ohio, announces the opening of a St. Louis office on December 7, 1945. The new office will serve as District headquarters, and will be in charge of J. A. Thompson, who for many years has represented Ferro in the St. Louis District.

The new office is located in the Arcade Building.

**Aydelott joins Strong Mfg. Co.**

E. C. (Elliott) Aydelott has joined the organization of Strong Mfg. Co. of Sebring, Ohio. He took over the duties of enamel shop superintendent December 1st, replacing W. Leighner who is retiring after a long period of service with the company.

Aydelott is a graduate of Ohio State University in Ceramic Engineering — Class of 1931. He served as ceramic engineer in the porcelain department at Frigidaire for a period of 4½ years; was enamel shop super-

intendent at the plant of Benjamin Electric Mfg. Co. in Des Plaines, Ill., for approximately 4½ years; and for the last five years has been connected with the Murray Corp. of America in

Detroit in various capacities — as ceramic engineer, aircraft division superintendent, standards division manager and home appliance division factory superintendent.

**Latest information on A. O. Smith plant at Kankakee, Ill.**

A leading Chicago newspaper carried a story recently of a \$2,000,000 A. O. Smith Corp. plant to be built near Kankakee, Illinois, and showed an architect's drawing of a giant factory built on an 80-acre tract. The article further stated that the company would manufacture household appliances.

A check on the authenticity of this story brought the following from a company spokesman: "As to your questions concerning our plant at Kankakee, we are in a position now to state that one of the products will be water heaters. I have seen a number of stories in magazines and newspapers which have stated flatly that we will make all types of home appli-

ances . . . All of these statements have been unauthorized by the company, for the simple reason that in many cases definite plans have not yet been formulated.

"A sketch showing several buildings on the property was entirely misleading and merely reports the architect's conception of what *could* be done in the future if operations at the Kankakee works warranted it. I can assure you that only one building is being erected.

"The structural steel is to go up next week (week of December 17). We can say nothing about when we expect to start operations except that it will be in the spring or early summer — before production starts."

**American Ceramic Society Chicago section meets**

The Chicago Section of the American Ceramic Society held a dinner at the Electric Club in Chicago on Friday evening, December 14. R. P. Stevens, section chairman, welcomed some thirty-five members and presented speakers for an interesting program. Included in his introductions were Ralph Cook, University of Illinois, vice chairman of the Section; J. J. Seaver, vice president of Day & Zimmerman, Inc.; and Charles Pearce, associate secretary of the American Ceramic Society, who was in Chicago for the meeting.

**Chicago selected as  
1947 convention site**

Mr. Pearce announced the selection of Chicago as the probable site for the 49th Annual Convention of the Society. The local Section issued a hearty invitation to the national group, and offered formal assurance of cooperation in promoting a successful meeting.

"Combustion in Industry" was the title of a talk by Dr. Gilbert E.

Seil, technical consultant, Day & Zimmerman, Inc., in which he explained many of the technical details concerning combustion as applied in the ceramic industry and showed interesting charts covering experiments related to ignition velocity, heat transmission, etc.

Dr. Seil is one of the "ceramic team" that recently returned to this country following study of European methods. It was apparent from his talk that valuable material was obtained in Europe, but in this connection the following statement, made when referring to designs for high temperature combustion chambers, is of interest: ". . . there was nothing in Germany that we haven't thrown away thirty years ago."

John R. Green, manager of steel and ceramic division, Brown Instrument Company, explained in detail the principles of pyrometric control for high temperature operations and illustrated the difference between electronic principles and mechanical methods of operating a pyrometer.

Cartoon illustrations on slides served to cleverly illustrate the principal points in Mr. Green's talk.

Announcement was made that the next regular meeting will be in conjunction with the Chicago District Enamellers Club meeting scheduled for February 23, 1946.

#### Fred Fowler returns to Fowler Mfg.

Returning to Portland after 27 months of service with the Seabees, Fred A. Fowler of 4432 N. E. 39th Avenue, has been made sales manager of the Fowler Manufacturing Company, makers of electric water heaters.

Fowler is a former University of Oregon student, and before entering the service in 1943 was employed for four years by the manufacturing company. His father, Paul L. Fowler, is general manager of the firm.

#### Two-refrigerator homes predicted

Almost every American home will be equipped with a second refrigerat-

or or a combination refrigerator-freezer within the next five years, it was predicted by James H. Carmine, vice president of the Philco Corporation in a recent speech.

Companies and industries which rely on pent-up consumer demand alone to carry them to postwar prosperity are doomed to bitter disappointment, Mr. Carmine said. "Within a short time the tremendous productive capacity of the United States will overtake this temporary demand, and it will be up to advertising, merchandising and old-fashioned selling to create new consumer wants and the urge to buy, if our factories are to operate at a high level and maintain national prosperity."

→ from Page 49

Naturally, an exhaust installation is an essential part of such a machine. Since the spray is directed downward, the most logical type of an exhaust would be one that acts downward and then into a dry, or a com-

bination dry and wet chamber.

With spray rooms equipped with replacement air, reclamation of overspray has taken on a new and important significance. Salvaging on a scale larger than ever attempted before seems to be in the cards.

Since the rate of material consumption is quite heavy—usually four spray guns functioning at one time and in long uninterrupted stretches—the material container should be of ample size to insure continuous maximum production with no delays during operating time for filling.

Conveyor speeds in the past have ranged from 13 to 16 feet per minute but today installations are being made on 20 ft. per minute conveyors. Assuming that a conveyor of 4 ft. width, fully loaded, is traveling 20 ft. per minute, the total area covered amounts to 4800 sq. ft. per hour. Allowing 25% deduction for area lost due to the spacing of ware on conveyor, the actual net figure is reduced to 3600 sq. ft. per hour. Worth while production is assured as this figure clearly indicates.



#### PROVED IN WAR—IN INDUSTRY

Book No. 20 lists a surprising variety of liquids and semi-fluids the Moyno will handle, gives volume and pressure ratings, shows typical standard and special applications. Keep posted on pumping progress. Ask us for Book No. 20, today!



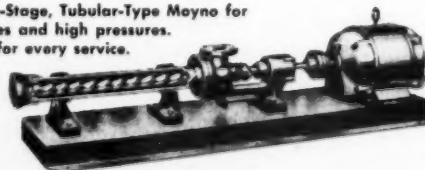
## This New Book is an Eye-opener! ...AND SO IS THE MOYNO PUMP

If you believe the R & M Moyno must be a complicated pump to be so Versatile—or if you've thought Moyno design so amazingly simple it just couldn't do all the things we say—here's a new book that will open your eyes!

Book No. 20 shows you why the Moyno needs no pistons or valves... how it handles free-flowing or highly viscous fluids, abrasives, and solids in suspension... how it delivers with positive pressure, without pulsation... and why it stands up where other pumps fail.

The Moyno is self-priming, pumps with minimum internal agitation, passes particles, resists chemical reaction. No other pump is like the Moyno.

Multiple-Stage, Tubular-Type Moyno for abrasives and high pressures. Others for every service.



**ROBBINS & MYERS • INC.** MOYNO PUMP DIVISION • SPRINGFIELD, OHIO  
In Canada: Robbins & Myers Co. of Canada, Ltd., Brantford, Ont.

MOTORS • HOISTS • CRANES • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878

# The Washington round-up

*By Wilfrid Redmond*

**T**HE reconversion industries are not expected to hit full stride until after the first of the year, and now it appears likely that they will run into difficulties with material shortages.

## Lead supply extremely critical

Lead, antimony, tin, and copper, which are essential to most consumer durable goods production, are in short supply, and in the case of lead the situation is desperate. The total supply of lead for the first quarter of 1946 is estimated at 217,000 tons, the requirements at 277,000 tons. This is a deficit averaging 20,000 tons per month. The deficit for December will have been about 10,000 tons. This situation reflects the mounting requirements of reconversion production. To supply some of the deficit in lead, CPA will dip into the Office of Metal Reserves stockpile, but for the balance it will be necessary to curtail consumption. The present stockpile of lead is 86,242 short tons.

Curtailment of consumption will probably be in the minor uses of lead. At a recent meeting of the lead producers industry advisory committee, members agreed that it would not be practicable to use substitutes for the five major uses of lead which are: cable covering, batteries, tetraethyl lead for gasoline, chemicals, and ammunition.

The lead supply picture is dark because there is at present no prospect of increasing the national stockpile. Imports are largely from Mexico and Peru. During the war we were the principal purchaser of lead from these countries. But now the liberated countries, which before the war were normally heavy buyers from Mexico and Peru, have resumed their purchases, and there is less for the U. S.

## Copper shortage may affect

### component supplies

Copper which was freed from control with the revocation of the Con-

trolled Materials Plan, is back on the list of materials in short supply. It was learned recently that requirements are currently exceeding supply by 35,000 tons monthly and that the supply agencies of the Government are in a huddle over the proposal to resume imports. Contracts with foreign producers expired at the end of October and have not been renewed. It is proposed to resume foreign purchases to replenish the stockpile which is now at 500,000 tons.

## Tin situation uncertain

Tin was recently placed under control of the General Imports Order, M-63. It was removed from import control in 1944 because under wartime conditions it was not possible for private industry to import the metal. Now, however, it was discovered that foreign sources were offering tin alloys in this country at a price which would have figured out at more than 52 cents on the basis of their tin content. The ceiling price of tin is 52 cents. The control was also resumed because large users in the U. S. were offering to buy tin alloys above ceiling, and one automobile manufacturer was reported to be offering to purchase tin-lead materials from foreign sources at any price.

The tin supply situation is still confused with respect to Malaya and the Dutch East Indies. A recovery of 17,000 tons of tin has been reported by the British in Malaya but the tin content of this find is still unknown. Army and Navy investigators who were supposed to report on stocks of tin found in these liberated areas and on the condition of equipment, failed badly in the assignment. CPA is now sending John J. Croston, of the Tin-Lead-Zinc Division to the Far East to prepare a statistical report on recovered stocks and the condition of mining and smelting facilities.

The stockpile of tin is now at 21,163 tons. We have 2,089 short tons of antimony metal in Government

stocks and 66 tons of antimony oxide. Until supply improves, distribution controls will be maintained on tin, lead, and antimony through orders M-43, M-38, and M-112 respectively.

## Steel castings granted price relief

An 11 percent increase in ceiling prices for all steel castings was recently announced by OPA. It was the first action in which OPA has granted an increase within the authority of Presidential directive rather than under the OPA reconversion pricing formula. The increase was urgent because many durable goods industries were in need of castings and without price relief the steel castings industry was unable to supply them.

It was the first instance where an industry was not granted an increase on the basis of average earnings during the years 1936-39. Although for the first six months of 1945 the industry as a whole operated at a profit level above the base period losses averaged 10 percent on sales for the third quarter. It was necessary for OPA, therefore, to grant an increase under Executive Order 9599 because it could not be allowed under the industry wide or product standard formula which OPA has worked out for reconversion industries.

This action appears to be a breach of the OPA reconversion price line. It follows a policy recently set forth in a letter by Stabilization Administrator John C. Collett to Chester Bowles, OPA administrator. Bowles had asked for a ruling on the question of adding materials price increases and approved wage increases to reconversion ceilings, or whether ceiling prices should be increased only if it is determined that the cost increase cannot be absorbed.

Collett ruled that the price increases should not result from the application of any mechanical formula, but from a determination, on the facts of the particular case, that a price increase is necessary either to maintain generally fair and equitable prices or to avoid hardship impeding reconversion.

In order that the ruling would not be misunderstood, the Stabilization

to Page 70 →

## In Reply to "Refrigerator Opportunity," The Finish Line, December, 1945, Finish

Vista Del Sol  
Palm Springs, Cal.

Dear Dana:

Your editorial in the December issue of *finish*, just read, struck a responsive chord in me. I am now one of that vast army of consumers — a sort of wholesale consumer. I have eight apartments, each of which has an electric refrigerator. All of them have porcelain interiors, paint exteriors. With daily maid service provided, these refrigerators really take punishment from wet rags and scouring powders. Needless to say, the interiors are all in perfect condition, but it will be no surprise to you, I'm sure, to know that there is not one refrigerator which doesn't have at least one spot where the exterior finish has been completely rubbed away.

Naturally, a place like this is not interested in buying deluxe models. But it would be a wonderful break to be able to buy a standard, service-

able model, which would retain its exterior beauty as well as its interior. More power to you in this!

Sincerely,  
Mahlon E. Manson \*

*\*Mahlon Manson was, for a number of years, active in the porcelain enameling industry, and is particularly well known to the industry as an authority on cast iron enameling.*

### Excerpts from "The Finish Line" for December:

Porcelain enameled refrigerators formerly sold to the consumer at from \$20 to \$30 higher than "standard" lines of comparable capacity. In addition to porcelain enameled exteriors, the "De Luxe" lines had more conveniences and additional gadgets to account for the difference in cost. Nevertheless, the buyer who wanted a porcelain enameled refrigerator exterior had no choice but to pay the "De Luxe" price, including the gadgets. He could not buy a "standard" model with porcelain enameled exterior.

There could be an opportunity for the refrigerator manufacturers who produced these "De Luxe" lines for sale at premium

prices before the war. With prices controlled, why not put the de luxe line on a high production basis? In other words, make it standard!

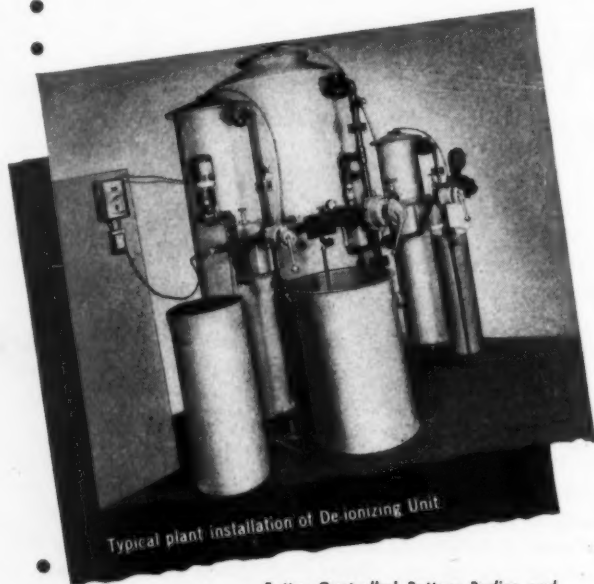
The new year, and the years to follow, promise to be bright for the refrigerator producer who first takes the "bull by the horns" and offers the "De Luxe" finish (porcelain enamel) on the exterior of his "standard" lines. Match the long life mechanism with a longer life exterior finish, and the answer is permanence and customer satisfaction for the appliance producer.

As quoted in an article by Judith Chase in Collier's magazine . . . The average American housewife walks more than 3,000 miles every year in her own home, washes 26,280 dishes a year, spends 9½ years of her life cooking for her family of four, cooks more than 57,000 meals, scrubs 34 tons of family laundry, and loses her house keys 43 times.

*Cranberries will not darken if they are cooked in a porcelain enameled saucepan. This smooth, satin-finished ware is non-absorbent and can not affect flavor or color.*

Lower your rejects by making your enamels with

## DE-IONIZED WATER



Typical plant installation of De-ionizing Unit.

Better Controlled Pottery Bodies and Glazes: ILLCO-WAY De-ionized Water can help the potter control his body and glaze compositions.

Reduction in rejects and elimination of copper heading have been obtained in leading ceramic plants when De-ionized Water was used in making the enamel. The varying acidic and basic reactions of natural waters affects the proper flocculation characteristics of frit and clay. Adjusting the enamel to make it function properly is costly as it requires materials and takes time.

You can assure yourself of a reliable water for enamel, by installing an ILLCO-WAY De-ionizing Unit. It will produce all the water your plant requires for capacity operation at a cost from 1% to 10% of that of distilled water. No fuel required, no cooling water. Maintenance is simple — no periodic dismantling for cleaning. Write for literature today!

Illinois Water Treatment Co., 866-1 Cedar St., Rockford, Illinois  
7310-R1 Empire State Bldg., New York City

Water Treatment Engineering



# Cost Reduction Equipment at Work



To meet the present competitive market we are all interested in cost reduction in the manufacture of our line of products. Ingram-Richardson operates cost reduction equipment which produces high quality ground coat and cover coat frits that will help you keep costs down in your own plant.

These same frits have helped us keep our costs down in our own enameling plants, and we are ready to prove to you that they can cut your costs, as well. We list the five following cost cutting features of Ing-Rich frits. May we have a chance to prove our claims? Phone, wire or write us—we will act **AT ONCE!**

1. LOWER MILL BATCH COST.
2. BETTER ADHERENCE RESULTING IN LESS REJECTS.
3. A HIGHER PERCENTAGE OF ONE COATS.
4. WIDE BURNING RANGES, A SAVINGS IN TIME & MONEY.
5. HIGHER REFLECTANCE AND A MORE UNIFORM COVERAGE.

**Ingram-Richardson**  
OF INDIANA  
**FRANKFORT**



**Manufacturing Co.**  
INCORPORATED  
INDIANA

# Gulf's "bright spot" is still bright at the...



## Before the fire

Left: Bird's eye view of the "point" of the Golden Triangle, Pittsburgh, Pa., showing the attention value of white architectural porcelain. Below: Closeup views of the Gulf station, both before and after the installation of architectural porcelain. Which one would YOU patronize?

ALL ARCHITECTURAL PORCELAIN ENAMEL BY THE ERIC ENAMELING CO.



THE illustrations on this page showing the Gulf Oil Corporation station at the intersection of Liberty Avenue and Water Street, Pittsburgh (the "point" of Pittsburgh's Golden Triangle), appeared in the August, 1945 issue of *finish*. The photographs were reproduced at that time to present a "before and after" story typifying the use of architectural porcelain enamel for modernization work.

Since these photographs appeared in *finish* a four-alarm fire swept through two tire retread companies located in the adjoining building, causing damage estimated at \$50,000. With any material other than porcelain enameled steel as a surface for the Gulf station, it might readily be expected that the station itself would have either gone up in flames or have

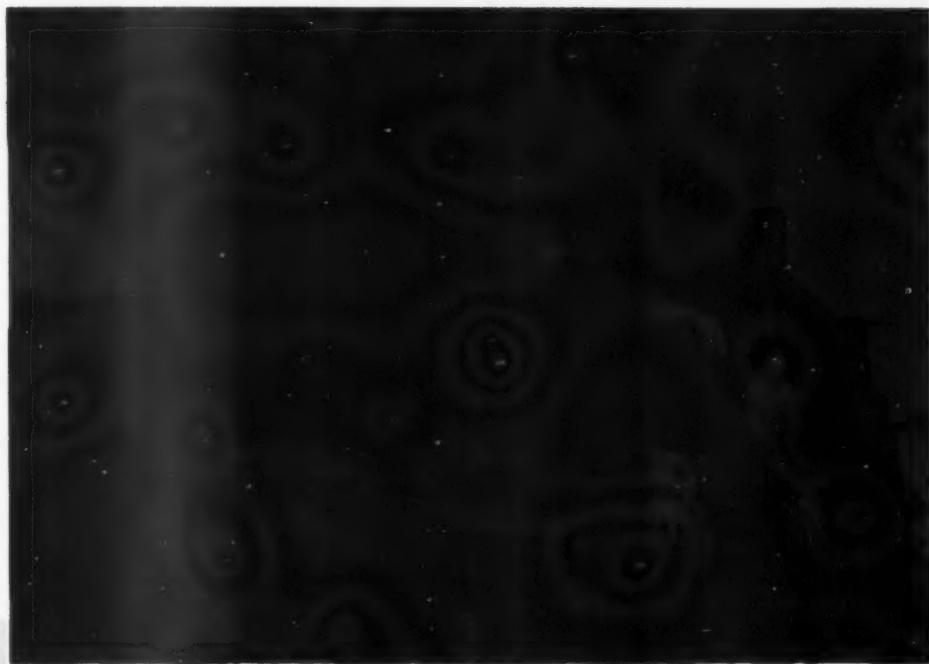
been so thoroughly damaged that a complete resurfacing would have been necessary.

The facts are that the porcelain enameled walls of the gasoline station remained undamaged while the three-story brick building, built flush

with the station, was almost completely destroyed. Throughout the ordeal of intense heat, water and flying embers, the porcelain enameled walls of the station remained free of damage. Ladders and heavy equipment battered against the walls and roof of the

## Golden Triangle in Pittsburgh

**"FIRE"**



**After  
the  
fire**

station during the fire. The station was subjected to extreme thermal shock from the cold water played on the fire while the porcelain enameled steel was at high heat.

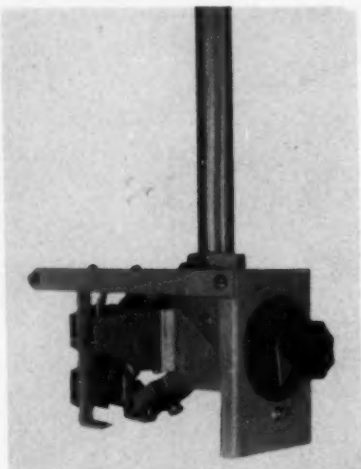
The "after the fire" photograph tells the final story. Nothing but rubble and blackened remains represent

the adjoining three-story brick building. The steel bill board above the station is completely denuded of paint, and otherwise badly damaged. The porcelain enameled station itself, however, gleams like new following a thorough "scrubbing" to remove the grime resulting from the fire.

While crossing the bridge near the Triangle following the fire, your editor spied the station and took the opportunity to stop his cab and give the station a quick inspection. It is recommended that any one who may be skeptical of architectural porcelain enamel do likewise.

## New supplies and equipment

### New temperature control switch

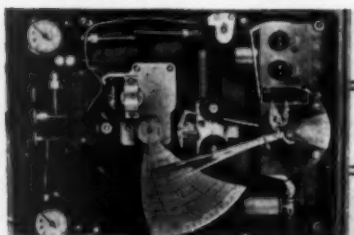


Burling Model E Temperature Limit Switch is available as a "one switch," "two switch" or "three switch" model. Important among its features is the fact that this switch has but one lightweight moving part.

As a "three switch" model, the Burling Model E Temperature Limit Switch is recommended for use (a) where the load is divided into three parts, (b) where one switch is used for controlling, one as a high limit, one as a low limit, (c) to give definite steps or positions to a three or four position diaphragm motor, and (d) to give three speed control of variable speed motor.

For further information contact Burling Instrument Company, 253 Springfield Ave., Newark, N.J.

### New calibrated means for process adjustments



A new indexet has been perfected by the Brown Instrument Company, Philadelphia. The new device, known as the "Adjustable Indexet," is described by engineers of the Brown

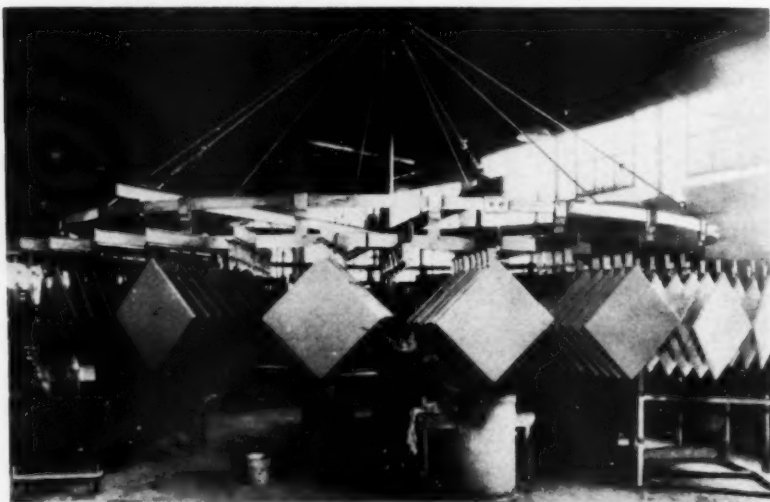
Company, industrial division of Minneapolis-Honeywell Regulator Company, "as essentially a pneumatic receiver with two new mechanisms added, consisting of 'span' and 'zero' shift."

The span or proportional adjustment permits a change between the span through which the instrument control point is moved and the change

in transmission pressure which moves the control point. Span dial is calibrated in terms of the distance in per cent of full scale that the control index will move along the chart per full scale changes in pressure. Span is the multiplying and dividing adjustment.

The zero, or linear, adjustment adds or subtracts a constant value. The zero dial is calibrated in terms of full scale and moves the zero position along the chart.

### New dipping wheel holds 200 to 400 pieces

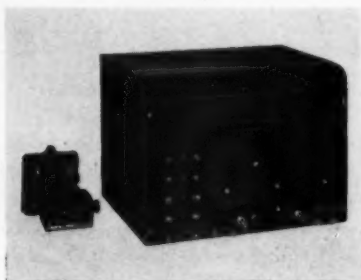


A dipping wheel 20' in diameter has been developed by the O. Hommel Company of Pittsburgh. Two bearings, one at the top and bottom, are said to eliminate all vibration and permit the enamel to "stay put," avoiding double draining and reducing streaks. A 25' semi-circular drier

is built on part of the circumference to eliminate handling. Spray booths can be installed at the end of the drier for black edging.

This wheel is designed to hold from 200 to 400 pieces, depending on their size, when fully loaded with porcelain coated parts.

### New high-speed counter



An improved two-decade Electronic High-Speed Counter, designed to fill

the need in fields unable to employ conventional mechanical counters, was announced by Potter Instrument Company.

This counter unit is particularly applicable for counts exceeding 10 cycles per second, a rate which is too fast for conventional counters, and in installations where mechanical counters would wear out prematurely because of the high-speed continuous operation.

For complete information on the counter discussed, write for Potter

Instrument Company's bulletin to 135-56 Roosevelt Avenue, Flushing, N.Y.

#### New hood resists strongest acids



An acid hood which gives chemical workers protection against all concentrations of nitric, sulfuric, hydrochloric, acetic, hydrofluoric and other acids has been developed. Introduction of this new hood was recently announced by the manufacturer, the Chicago Eye Shield Company. It is reported that inorganic and also a large number of organic acids have absolutely no deteriorating effect on the hood.

The clear window provides normal vision and is equally acid-resistant. When worn, the hood covers the head, shoulders, chest and back. It is snugly tied at the waist. An air-feed unit as well as side vents for air circulation are included.

Further information about the new Cesco Acid Hood can be obtained by writing to the Chicago Eye Shield Company, 2300 Warren Blvd., Chicago 12, Illinois.

#### Handy viscometer for flow tests

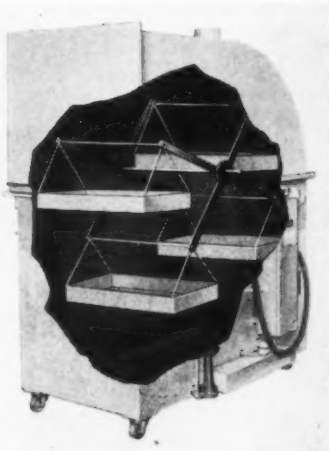
Specific gravity and rate of flow of ceramic slips can be determined in a few minutes with the OHCO Viscometer. Tests can be performed by any one in the mill room. The Viscometer, a gram scale, a 100 cc graduate cylinder, and a stop watch are used.

The instrument consists of a 200 cc

brass cylinder, tapered at one end, and fitted with a small orifice nozzle. Special nozzles with larger and smaller orifices are available for extra viscous or fluid slips. A tight fitting cap completes the apparatus.

For complete information and instructions for use, write to the O. Hommel Company, 209 Fourth Avenue, Pittsburgh, Pa.

#### "Rotomatic" vapor degreaser



The new addition to the Phillips line of metal cleaning machinery is the Rotomatic vapor degreaser which is said to offer both semi-automatic operation and a controlled cleaning cycle.

The Rotomatic loading device is mounted on standard vapor degreasers and consists of a rotating frame, from which baskets are suspended in a Ferris Wheel manner.

The unit is completely hooded with hanging door covering the opening for loading and unloading baskets, and is available in three sizes, handling approximately 1200, or 3000 or 4000 pounds per hour.

Complete details are available from Phillips Manufacturing Company, 3412 Touhy Avenue, Chicago 45, Ill.

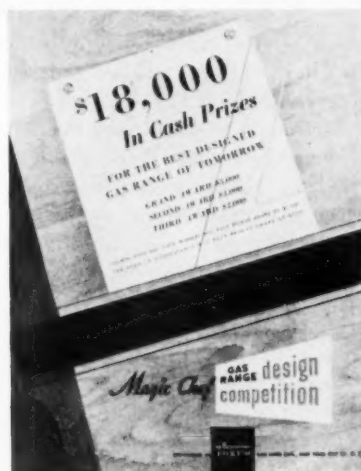
#### Industrial literature

##### \$18,000 design contest

A contest for the design of the "Gas Range of Tomorrow," involving 16 cash awards totaling \$18,000, will be conducted by the American Stove

Company, S. E. Little, vice president, has announced.

The contest should elicit widespread interest among professional designers, architects, engineers, stu-



dents, home economics experts, and the non-professional public as well. It will be sponsored by Architectural Forum, with George Nelson, of the American Institute of Architects, as professional advisor.

A booklet covering the rules and technical data required to enter the design contest is now available to prospective entrants. The technical data included is presented simply, yet comprehensively, and should prove extremely helpful to both the professional and non-professional entrant.

This booklet, which is profusely illustrated, may be obtained by sending a postal card to George B. Nelson, A.I.A., care Architectural Forum, Dept. P-3, 350 Fifth Avenue, New York, N.Y.

#### New catalog on Wheelabrator Swing Tables

Complete information about the new Wheelabrator Swing Table is contained in the catalog No. 214 recently published. Detailed information on each of four sizes including construction features, overall dimension drawings and specifications is contained in the twelve page catalog.

A copy of catalog No. 214 may be obtained directly from American Foundry Equipment Company, 555 S. Byrkit Street, Mishawaka, Indiana.

## P.E.I. Forum Papers

(Continued from Page 41)

### Color standardization and problems involved in matching paints and porcelain enamel

By NORMAN F. BARNES

The colors involved in the color matching of paints and porcelain enamels includes all of that group of colors which we usually call the rainbow or visible spectrum. Because of the lack of sensitivity of the eye beyond this region we do not have to consider the ultra violet or infra red aspects of the problem. Since we are dealing with color matching problems, it will be necessary that we consider both the physical and psychological aspects of color.

From the observer's point of view color is actually a function of three main factors. We might call these factors "what," "how," and "who." The first one is concerned with the physical characteristics of a material which are responsible for its color appearance. In other words, every material has certain inherent characteristics which are responsible for the manner in which it reflects or transmits light. The second factor is concerned with the manner in which the sample is illuminated and viewed. Thus, a material may look one color if viewed in daylight, or it may look slightly different if viewed under tungsten light. The third factor in the color appearance of a material is the observer himself — in particular, the visual characteristics of his eyes. The sensitivity of the eye varies considerably with the color of light involved, being a maximum in the green and falling off rapidly in the far red and in the far violet. Psychological factors and abnormal color vision such as color blindness add additional variables to the color matching problems.

Two types of color measurement and classification systems are considered. The first is the Munsell system which is based upon visual color matching and classification. The second is the spectrophotometric system based upon the physical characteristics of the material itself and independent of the type of illumination

and characteristics of the observer. Color is three dimensional and, whatever the system, three attributes must in some way be defined. The first is, "What color is it?" — red or a green for example. The second is, "How light or bright a color is it?" and the third is, "How pure a color is it?" In other words, is it a vivid color of high purity or is it a "washed out" color?

The success of visually color match-

ing organic finishes and the inorganic porcelain enamels is due to the fact that the eye averages small color differences in the various regions of the spectrum. Thus, providing these differences are small in the first place, the eye will say two samples are matched if their averages are the same for a given set of illumination and viewing conditions.

Color standardization, or color uniformity as it might better be called, offers great advantages not only to the ultimate consumer but also to the apparatus manufacturer and the finish supplier. Such uniformity can best be achieved through the standardization of the raw materials and the actual finish processes themselves.

### The Washington round-up

(Continued from Page 63)

Administrator issued the following directive, which OPA is now using to measure price increases:

"Maximum prices determined under the reconversion pricing formula approved in Directive No. 78 (10 F.R. 11074) or under any other pricing formula designed for use during an interim period until reliable operating costs are available, shall not be permitted to reflect any increase in legal prices of materials authorized or occurring hereafter, or any increase in wage or salary rates approved by the appropriate wage or salary stabilization agency or instituted hereafter, unless the Price Administrator finds that the reflection of such increases is necessary to maintain generally fair and equitable prices or to prevent hardship impeding reconversion."

To summarize this development in reconversion pricing, OPA will not apply mechanical formulas as heretofore, but will grant increases where there is sufficient evidence to prove that they are necessary to prevent the reconversion program from stalling.

#### Washing Machines.

In issuing Maximum Price Regulation No. 86, OPA made several errors of omission and has hastened to correct them. In the provision

which permitted the addition of \$10 to the ceiling price shown in the table for a washing machine, if the machine is equipped with a water pump, the regulation failed to limit the authority to make the \$10 addition to wringer type washing machines. Hence, a differential is added for the addition of a water pump only in the case of wringer type washing machines which may be sold with or without water pumps.

The amendment also adds Dakota to the list of states in Zone 1 and Alabama to the list of states in Zone 2. These states were inadvertently omitted in the original regulation.

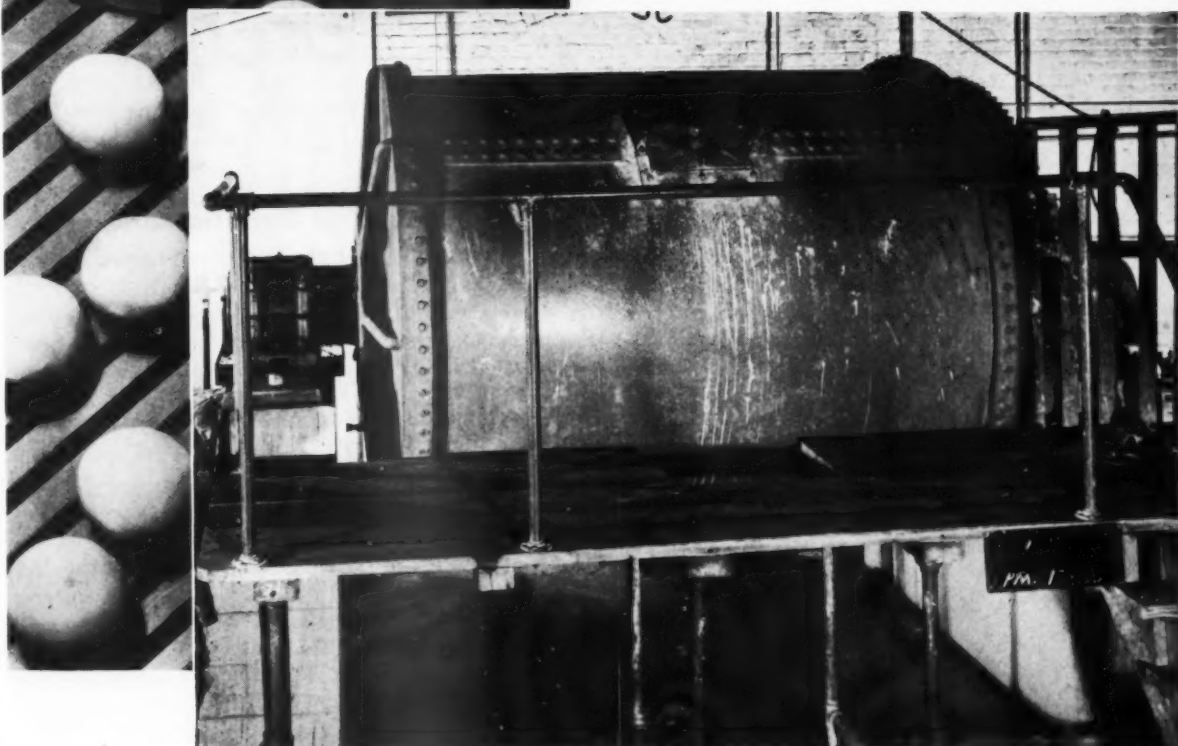
A manufacturer may also apply to OPA to alter his zoning practices and prices and those of his distributors and dealers when it appears that no increase in the general level of prices of machines covered by the regulation will result. This provision is intended to permit manufacturers of those machines returning to production to make changes in their distributive and resale price structure to adjust it to changes in the business situation due to reconversion or to improve or simplify it. Such changes will be made, however, only if they do not increase the average cost to purchasers at each level of distribution for the manufacturer's machines.

to Page 76 (Column 3) —>

JANUARY • 1946 finish



## Keep Your Mills IN PRODUCTION With McDANEL PRODUCTS



**Y**OU WILL want to get every possible gallon of milled enamel from your mill room in the months to come. Unnecessary delays for mill lining repairs will be costly. To avoid these delays see that every mill is lined with McDanel extra-fired mill lining brick—the product that has earned its place in the enameling industry by giving longer lasting service.

Then, to make the picture complete,

specify McDanel mill-tested grinding balls. You will have a perfect team of long wearing materials to assure continued high production in your mill room.

But, you will have to give us more time than usual to fill your orders due to the deluge of business that we are receiving. We are doing everything in our power to increase production, and you can be assured that McDanel quality is the same for every shipment.

### **McDANEL REFRACTORY PORCELAIN CO.**

BEAVER FALLS, PENNSYLVANIA

CHICAGO VITREOUS ENAMEL PRODUCT COMPANY • EXCLUSIVE REPRESENTATIVES FOR THE ENAMELING INDUSTRY.

finish JANUARY • 1946

## Spraying - vs - dipping ground coat enamels

(Continued from Page 26)

tion system are more elaborate than for dipping. A typical overhead conveyorized installation should include sufficient space for an operator to adequately hang and visually inspect each part as placed on the conveyor. The spray booth requirements are a single operator reverse booth, followed by a forward booth, long enough to accommodate anticipated number of sprayers at the rate of six to eight feet per sprayer. This is followed by an additional reverse booth to accommodate a single operator. All spray equipment must be of the complete material recovery type in order to control material consumption at a point competitive with dipping.

Nothing special is required in the way of pressure tanks and spray guns, but adequate air pressure regulation should be provided so atomizing pressure used for each operator may be varied to any advantageous point.

This set of equipment will give us the following sequence of application, assuming a simple square panel with return flanges is to be coated.

1. Place part on conveyor with all essential cover area free of contact with hanger.
2. Spray back side of part with reclaim material, using low spraying air pressure.
3. Spray face area, using high air pressure.
4. Spray lower edges coming and going, using reduced air pressure.
5. Spray upper edges coming and going.
6. Tie in spray of front and back, sprayer on back-side using low air pressure.
7. Dry part and take off.

The speed of the operation is governed by a combination of size of parts, shape, and breakdown of areas to be covered.

The square foot production per man hour that can be attained is similar for each system for similar parts.

The training period for an operator

on a spray set-up is somewhat longer but requires similar dexterity and strength. The supervision requirements are similar for each system, there being merely a different set of duties for supervision.

In conclusion, it can be stated that each system has a definite place and its limitations. We have tried to point out where spraying can improve quality with reference to smoother surface, more positive control of enameling defects such as reboil and black edge blisters, and black specks due

to contamination — with other things being equal. Spraying also opens up mill addition formulation since we are not tied to close limits of enamel slip characteristics. The use of spray application is at its greatest advantage when confined to parts requiring a high quality white finish. It offers no advantages when the finished product is used as a ground coated part.

This article is from a paper presented by Mr. Gerdes before the Porcelain Enamel Institute Forum at Ohio State University, Columbus, Ohio, on November 30, 1945.

## Case histories of architectural installations using porcelain enameled steel

(Continued from Page 30)

job for which combinations are still to be chosen from the wide color selection available.

### Both new construction and remodeling in abundance

Another interesting new job is an office building designed for porcelain construction, to be put up for the Wedgewood Stove organization at Newark, California. This will be a 200' x 50' frontage. Work is due to commence early in the year.

Allen believes there will be a good

deal of new work, but even more remodeling for building owners who are disillusioned with other materials.

"About the only kickback I ever get on arguments for porcelain," Allen says, "is from property owners who want a highly light-reflecting surface like glass. A client of mine in Oakland, owner of the Pirate's Den bar, solved this little problem very much to his satisfaction by waxing. He keeps his porcelain enameled front waxed and polished and looking like a new automobile."

## Progressive purchasing policies

(Continued from Page 33)

company is no stronger than its weakest vital source.

3. The development of a mutual understanding with properly selected sources relative to all pertinent points which affect quality, specifications, engineering and production requirements.

4. Careful overall planning based on the establishment of realistic de-

livery schedules with appropriate control over inventories to insure both the proper flow of materials, as well as a maximum turn-over of inventory.

This article is from an address by Mr. Guthrie on Tuesday, December 4, before the Institute of Cooking and Heating Appliance Mfrs. at their annual meeting in Cincinnati, Ohio.

## Enamelers club meetings

The Central District Enamelers Club meets at the Hollenden in Cleveland, on Friday, January 11.

The Chicago District Enamelers Club meets at the La Salle Hotel, Chicago, on Saturday, February 23.

.....

# **GOOD MERCHANDISING**

includes

# **GOOD PACKING**

.....

## **WOODEN BOXES AND CRATES—ALL KINDS**

**Plywood • Wirebound • Hinge  
Corner • Nailed Crates • Wood-  
Steel • Nailed Wood • Shop and  
Tote Boxes**

**★ Consult with our packing engineers.  
We offer you the services of our designing  
and testing laboratory without obligation.**

**CHICAGO MILL AND LUMBER COMPANY**

111 W. Washington Street

Chicago 2, Illinois

*Pioneers for Over 60 Years*

*Plants at: Helena, Ark. • Greenville, Miss. • Tallulah, La. • Chicago, Ill. • Plymouth, N. C.*

## Super opaque titanium enamels

(Continued from Page 21)

be .006 grams per square inch. This relatively low weight loss and poor spot test rating indicates that surface attack is severe, but once the surface layer is removed, further attack is considerably reduced.

### IV SUMMARY

1. A highly opaque titanium enamel (No. A29) with good color, gloss, and texture is submitted. This enamel was found to have eighty per cent reflectance at twenty five grams per square foot. Dr. Niklewski's composition and the composition of A29 which is a modification of the composition recommended by Niklewski are shown in Table II.

Table II  
Frit Compositions\*\*

	A1	A29
Feldspar .....	4.2	4.5
Quartz .....	25.1	25.3
Soda Ash .....	23.2	24.2
Sodium Nitrate .....	2.3	2.4
Whiting .....	—	3.4
Zinc oxide .....	21.6	19.5
Cryolite .....	2.5	2.6
Sodium Antimonate ....	.8	0.8
Titanium oxide .....	16.9	17.2
Magnesium carbonate ..	3.4	—

\*\*The compositions are expressed here in per cent. In the diagram, batch weights were used so that modifications in either the frit batch or the melted composition could be readily made.

2. Incorporation of boric oxide in this type of frit was harmful to both color and gloss.
3. Potassium oxide and alumina tended to produce matte surfaces.
4. Cryolite was found to be a better flux than fluorspar or sodium silicofluoride. The fluorine content must be low for good gloss.
5. Calcium compounds and whiting in particular improved the color of these enamels.
6. A high zinc oxide content was necessary for color purity and high opacity. The crystals which formed during firing were thought to be a compound of zinc and titanium.

7. Thorough mixing of the frit batch was necessary to prevent the titanium oxide from balling up and forming seeds in the glass. Over-smelting resulted in reduced opacity and poor color. Undersmelting was harmful to gloss and texture. It was necessary to maintain an oxidizing atmosphere during smelting operation.
8. The surface of this enamel was not resistant to attack by ten per cent citric acid, but its solubility resistance as determined by E.U.M.C. test was very good.

Reference is made in this article to Dr. Branislav K. Niklewski.

Dr. Niklewski came to America and studied in the Department of Ceramic Engineering at the University of Illinois, receiving his Master of Science Degree in Ceramics in 1938. Following this, he worked in several American plants and then returned to Poland, where he was employed at the Herzfeld & Victorius Sp. Akc.,

Grudziadz, Poznan, Poland.

When Germany invaded Poland, Dr. Niklewski entered the Army and with the collapse, escaped into Hungary where he was interned for a period of time. He then escaped from Hungary and went to France, where he trained Poles for the Polish Army Unit. With the collapse of France, he escaped to Switzerland, where he was again interned. After a period he gained the confidence of the Swiss and was allowed to do consulting work for several enameling companies: J. Haltinner Eisenhandlung, vamilie EggerMuller, and p.a. Familie A. Morgeli.

He also continued his education at the University of Zurich, where he received the degree of Doctor of Philosophy in 1944. With the liberation of France, Dr. Niklewski was able to go to England where, although still in the Polish Army, he has been given liberty to work in the enameling industries.

C. M. Andrews was a special research associate at the University of Illinois when the data for the preceding article was completed and submitted to *finish* for publication. Mr. Andrews has since become associated with a frit manufacturing company (See December 1945 *Finish*)

## Thirteenth annual meeting of cooking and heating appliance manufacturers

(Continued from Page 47)

talk "Management's Part in the Negotiation of a Labor Contract."

F. H. Guthrie, president of Newark Stove Company, Newark, Ohio, presented a straight-from-the-shoulder discussion of "Progressive Purchasing Policies," and included many candid references to questionable purchasing policies that have been born of the present raw material crisis. (Mr. Guthrie's presentation appears in this issue of *finish*.)

### "Stove pricing forum"

A spirited discussion of pricing problems closed the Tuesday afternoon session. Officials of the Consumers Durable Goods Branch of OPA and Samuel Dunkel, managing director of the Institute, served as a panel for answering questions from the stove manufacturers present.

### Social highlights

Highlights of the social activities

at the convention was the President's Reception and Dinner in the Pavillon Caprice Tuesday evening, with an accompanying elaborate floor show and entertainment program. Informal receptions were sponsored by Robertshaw Thermostat Company, Youngwood, Pa., and the Merchandise Mart, Chicago, in their respective suites.

### Division meetings

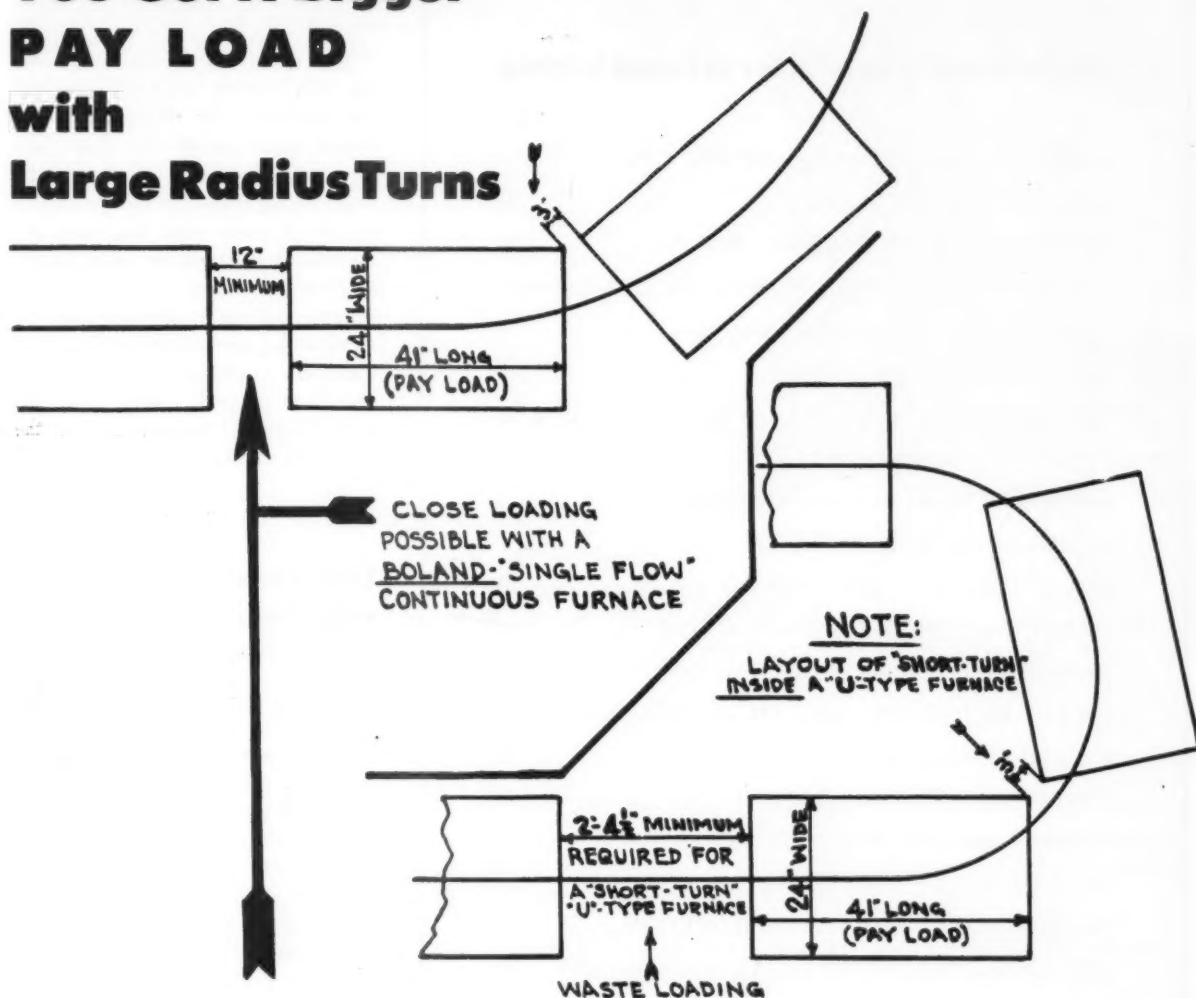
Wednesday was taken up entirely with meetings of the various divisions of the Institute, including the Gas Range Division, the Oil Division, Kerosene Stove Division and the Solid Fuels Division.

Controllers and cost accountants of stove companies were also afforded an opportunity of discussing approved accounting methods within the industry and to study complex methods governing applications for

to Page 76 (Column 3) →

JANUARY, 1946 *finish*

# You Get A Bigger PAY LOAD with Large Radius Turns



This drawing shows one big reason why Boland "SINGLE FLOW" Continuous Furnaces produce a bigger daily "pay load" of finished parts. Wide radius turns outside the furnace makes closer loading possible. No conveyor space is lost to accommodate short radius turns inside the furnace.

WRITE OR WIRE FOR  
OUR CONSULTATION  
SERVICE.

For "wrap around" stove bodies, "one piece" refrigerator cabinets, sanitary ware or any large fabricated parts, the advantage of this feature in Boland furnaces is obvious.

Boland can build U-type furnaces too, but the many advantages in a Boland-built "SINGLE FLOW" Continuous makes it far and away the best investment for enameling plants.



Buy the furnace with the larger "Pay Load."

## ALBERT J. BOLAND COMPANY

407 NORTH EIGHTH BUILDING • ST. LOUIS 1, MO.

Designers and Builders of Continuous and Box Type Enameling Furnaces  
finish JANUARY • 1946